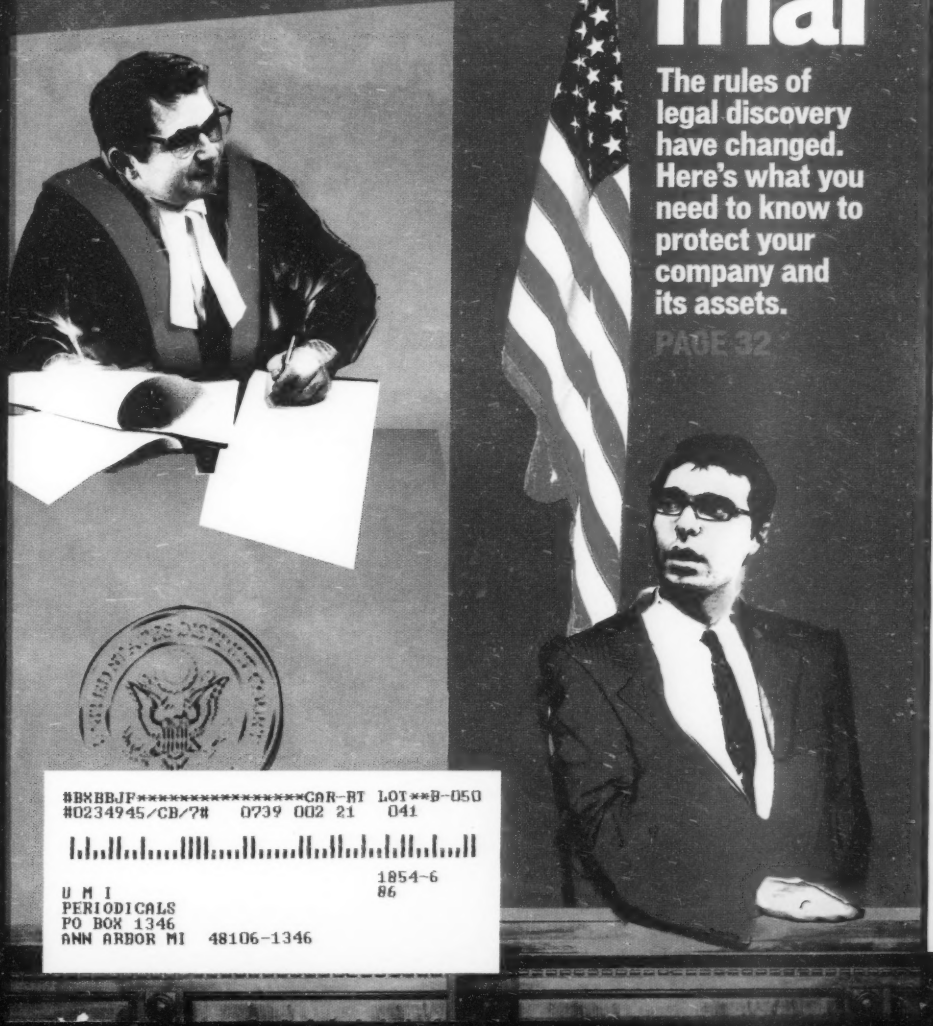
The Grill: Esme Vos, founder of MuniWireless.com, talks about what goes wrong in municipal Wi-Fi projects, and why Europe does them better. PAGE 24

COMPUTERWORLD®

SPECIAL REPORT

Storage on Trial

The rules of legal discovery have changed. Here's what you need to know to protect your company and its assets. PAGE 32



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OCTOBER 8, 2007
VOL. 41, NO. 41 $5/COPY

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If you've mislicensed Windows, Microsoft is offering a new way to 'get legal.' PAGE 6

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The Highly R

VOLUME 1 – ISSUE 5

Windows Server 2003

For all stories go to

SWISS SEES RELIABILITY SOAR WITH WINDOWS SERVER, CHECKS RED HAT AT GATE

Tom Nagy for The Highly Reliable Times

THE SWISS INTERNATIONAL AIR LINES hub, located in Zurich, Switzerland.

Microsoft

eliable Times

www.microsoft.com/reliable

special edition

Global Airline's Migration Yields 99.95% Reliability

By MICHAEL BETTENDORF

ZURICH, Switzerland–Swiss International Air Lines (SWISS), Switzerland's national airline, serves 70 destinations around the world with 6,500 employees in 105 branch offices. Today, 14% of SWISS's total ticket sales are processed through its online flight booking system at Swiss.com, with volume increasing by 30% per year. 24x7 operations are critical for this site because of its importance to the airline's business, but the original Red Hat Linux–based booking system was not meeting SWISS's requirements. So the airline began its search for a more reliable platform.

Reliability also drives market perception in the airline industry, according to SWISS CIO Frank Meyer. "In our business, having a plane in the maintenance hangar is not good for our image. It is the same for our online service—people expect it to be up and running," says Meyer.

After an intensive evaluation, Meyer and his team chose Windows Server® 2003 and .NET. Since migrating the online booking system to Windows Server, SWISS has seen reliability rise to 99.95%. In addition, while the previous Red Hat Linux–based system could only handle 250 concurrent users, the new system can now handle significantly more traffic than that. Meyer is confident about the effect of these changes: "Moving uptime to 99.95% while increasing performance to handle a greater number of users enables our team to easily handle the 30% growth we are seeing in our online sales."

For the full SWISS story, plus other case studies and independent research findings on the reliability of Windows Server versus Linux, visit the Web site at microsoft.com/reliable

STUDY: Side effects of reliability can include smiling, calmness

A study released today shows significant mood improvement in IT executives such as SWISS's Frank Meyer (above) when they experience Windows Server reliability.

"Windows Server has given us the reliability to grow our online services and differentiate ourselves from the competition. With Linux, we didn't get the reliability or flexibility we needed."

– Frank Meyer, CIO, SWISS

RELIABILITY ROUNDUP Organizations using

NEWSPAPER AWARDS *The Highly Reliable Times* took home nine gold medals at the 152nd

FOR BREAKING NEWS GO TO COMPUTERWORLD.COM

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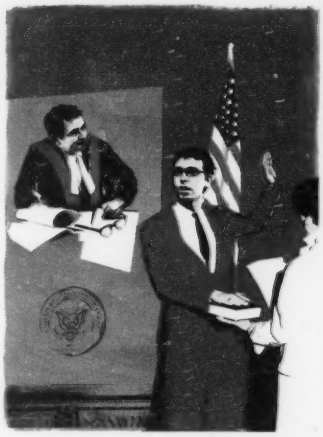

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7 A federal judge rules that **Target's Web site** violates federal and California statutes for handicapped accessibility. | **SCO CEO Darl McBride** insists that the company isn't knocking on heaven's door.

10 Microsoft is aiming a new set of **SaaS technologies** at enterprise users.

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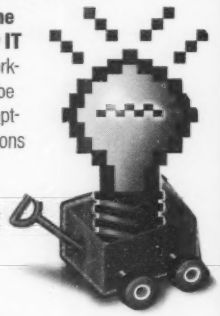

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What does it take to provide 360° communications in a 24/7 business world?

Expectations are high for communication systems in today's connected world. They are expected to deliver a lower cost of ownership while ensuring that people are available and have the tools necessary to collaborate. NEC, the global IT and networking company, delivers mobility and unified communications that integrate with our UNIVERGE® IP Telephony platforms, to improve business processes and customer relationships by connecting people to people and the information they need anytime, anywhere. NEC. **Empowering you through innovation.**

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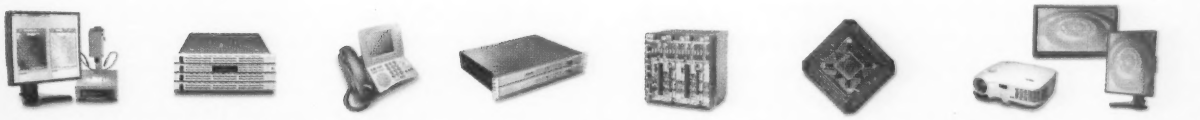

IT SERVICES AND SOFTWARE **ENTERPRISE NETWORKING AND COMPUTING** SEMICONDUCTORS **IMAGING AND DISPLAYS**

NEC is proud to have the No. 1 worldwide ranking in enterprise telephony extension line shipments in 2006, for the second year in a row, according to Gartner.*

*Market Share: Enterprise Telephony Equipment Worldwide, 2006; Megan Fernandez & Isabel Montero, July, 2007 ©NEC Corporation 2007. NEC and the NEC logo are registered trademarks of NEC Corporation. Empowered by Innovation is a trademark of NEC Corporation.

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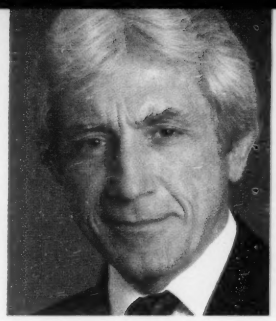
■ EDITOR'S NOTE

Don Tennant

Job Acquiescence



YOU'D NEVER guess what came in the mail last week. Believe me. You'd never, ever guess. Unless, of course, you said, "A bronze-tone, life-size plaster sculpture of a man's hand clicking a mouse, mounted and designed to hang on a wall." If you said that, you're either my mother or you're very scary. Not that those two things are mutually exclusive, mind you.

You may remember my mom. As I mentioned in a column last year, she's the one with the ceramic cow that's dressed up like Judy Garland. Mom sent me the plaster mouse-clicking amputated hand with this note: "When I saw this, I hoped you would like it, but if you don't, pretend you do."

It goes against my better judgment, but I'm sure that's exactly what I'll do. I pretended to like the Statue of Liberty lawn sprinkler, and I pretended to like the flashing patriotic mirror. Ownership of a plaster mouse-clicking amputated hand is where that strategy got me. And if I keep it up, I'm liable to get the cow. Still, what the heck. Mom's heart was in the right place.

It's one thing to pretend that you like something when you're talking about a gaudy lawn ornament or a creepy wall hanging. It's another thing entirely when you're talking about something that matters — something like, say, your job.

If a lot of people in the IT profession were truly honest about it, they'd admit that they're really not all that crazy about their jobs. Yet they find themselves pretending that they are, if only to convince themselves that they're fulfilled and that there's no reason to make a change. In short, they're slaves to job acquiescence.

But it really doesn't have to be that way. There was an article posted on our Web site last week that needs to be read by anyone in the IT workforce who's unable to genuinely say that he loves his job and that it's the job he wants to be doing at this point in his career. Titled "Seven steps to take now for a better job in '08," the story by *Computerworld* contributing writer Mary Brandel is essentially a map that helps show the way out of the mire of pretense and acquiescence.

■ It's one thing to pretend you like a gaudy lawn ornament or a creepy wall hanging – but it's another thing when you're talking about your job.

Of course, knowing the way and actually getting there are two entirely different things. Getting there, the article explains, is time-consuming, and it requires an enormous amount of work. I'm disinclined to rehash the entire article here, but what warrants emphasis is the key role that communication plays in making that hard work pay off.

First, it's essential to communicate with your manager to make sure he's fully aware of what you're looking for in your job — no pretending that the status quo is what you want. Grant Gordon, a recruiter in Kansas, is right when he says that heeding this advice will put you a step ahead of the competition, because so few people bother to make that effort. "It's the most critical advice," he says, "but also the most overlooked."

On a broader level, professional-grade verbal communication skills are a must, and Brandel's piece offers a superb tip: Join an IT professional organization and take advantage of any public speaking opportunities that arise from that association.

Sean Ebner, a recruiter in Florida, points out that that practice "helps you become more comfortable framing conversations in professional terms." No doubt, an articulate bearing will open doors that seemed impenetrable before.

The article also stresses the value of written communication skills, and I can't underscore that point fervently enough. Experts note that such skills can be honed simply by writing more, and suggest that blogging can be an especially effective vehicle. While the ability to write well is no substitute for technical skills or business savvy or managerial acumen, lacking that ability will assuredly eliminate you from consideration for opportunities you'd never need to pretend to love.

If you need a hand with any of this, let me know. I have an extra one I wouldn't mind parting with. ■

Don Tennant *is editor in chief of* Computerworld. *Contact him at don_tennant@computerworld.com.*

Diverse and Proud

My boss and I had an interesting discussion after reading Don Tennant's Editor's Note in the Sept. 3 issue ["Building Trust"]. We had always considered ourselves special because our IT department had been, until recently, majority female, despite the scarcity of female employees in the IT industry. The balance shifted when we lost one of our female professionals and gained a male.

I felt that we had lost our special status, but after reading Tennant's article, we consider ourselves special once again, since I am proud to say our new hire is African American.

■ **Joe Gabanski,** *systems operation manager, City of Lake Forest, Ill.*

Failing the Stress Test

Virginia Robbins' column "Cooling Down From High Stress" [Opinion, Sept. 10] could have been written for me. I find that high stress is more common than ever. Companies get so focused on priorities, deadlines, rules of the game, etc. that their employees lose touch with how to behave like civilized people. We are machines expected to produce more and more without adequate staffing or the necessary tools for the job.

Can one really produce more with less, while still producing "quality" work and 100% uptime? I don't think so. Positive motivation is a better approach.

■ **Stephanie Schulze,** *corporate customer support IT manager, Alpena, Mich., Stephanieschulze@charter.net*

Not So Excel-lent

The article "Excel 2007 Flunks Some Math Problems" [*Computerworld.com*, Sept. 26] indicated that the error occurs in a dozen instances. It is much more than a dozen. I divided 65,535 by every whole number from 1 to 65,535 (by copying the formula), then multiplied the result (in a second calculation) by the original whole number. There were numerous instances of the result being 100,000, though every answer should have been 65,535.

■ **Ken Weimer,** *professor, Kellogg Community College, Battle Creek, Mich.*

COMPUTERWORLD.COM

The 10 Funniest YouTube Help Desk Videos

Video parodies bring humor to what can be an often-frustrating process for both IT staffers and users. Here are our favorites. computerworld.com/networking

Coffee Shop Toys: The Future Of Wireless Web Apps

Small wireless devices that connect effortlessly to Web services will be big someday – think iPod Touch. But before that happens, there are some challenges to overcome. computerworld.com/mobilewireless

Computers Are Listening – So What?

OPINION: Columnist Mike Elgan is troubled by knee-jerk opposition to a free VoIP service. Yes, Pudding Media's system "listens" to your calls in order to create targeted ads, but that's not eavesdropping, he argues. computerworld.com/mobilewireless

Vista SP1 Beta's Biggest Mod Is to the Search Function

REVIEW: With the release of a beta of Vista's first service pack to a limited group of testers, Microsoft plans to tidy up some loose ends in the operating system. Users can now use third-party search tools – yes, even Google's. computerworld.com/software

Giving Up on Vista? Here's How to Downgrade to XP

FAQ: For some PC users, what's old is new. They've tried Windows Vista but don't want or need it, and now they're ready to turn back the OS clock and reinstall XP. Here's how to do it. computerworld.com/software

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News Digest

FIND THE FULL STORIES AT **COMPUTERWORLD.COM**

THE WEEK AHEAD

MONDAY: Conference sessions will begin at Gartner's Symposium/ITxpo 2007 in Orlando and at the Society for Information Management's SIMposium 07 in Memphis.

TUESDAY: Microsoft plans to release seven security updates – four rated critical – for Windows and other products.

WEDNESDAY: The Virtual Worlds Conference and Expo 2007 will open in San Jose, with sessions focusing on the use of virtual worlds by businesses.

STEPHEN WEBSTER/GETTY IMAGES

SOFTWARE PIRACY

Microsoft Adds License for Making Windows XP Legal

MICROSOFT Corp. amped up its antipiracy campaign last week, adding a software-licensing program aimed at large customers that need to "get legal" after being fingered for using counterfeit or illegally installed copies of Windows XP.

The new program, dubbed the Get Genuine Windows Agreement (GGWA), plugs a big hole in Microsoft's 18-month-old effort to stop the pirating and unauthorized use of Windows, said Cori Hartje, director of the company's Genuine Software Initiative.

Home users who were nabbed for running counterfeit versions of Windows have been able to buy legitimate licenses quickly and simply, Hartje said. "But we didn't have a good way to programmatically address the same need for larger-scale customers," she added.

The GGWA is based on Microsoft's standard volume-licensing contracts. Hartje said she expects that most of the organizations that use it will do so not because they find counterfeit copies of Windows XP on the PCs they buy, but because they have "mislicensed" the operating system.

Sunwest Management Inc. in Salem, Ore., is the kind of user Hartje has in mind. CIO Milton Bliss said the operator of nursing homes and retirement communities was contacted by Microsoft for a software audit last year. Sunwest didn't have good inventory management tools and was found to be using more licenses than it had paid for, Bliss said.

"The challenge is knowing exactly what is on your network," he added.

But Barry Libenson, CIO at Ingersoll-Rand Co.'s corporate offices in Montvale, N.J., said Microsoft's contract terms are complex and "in some cases Draconian."

"There's a very good reason why people don't always follow the license, and it's not because the customers are stupid," said Libenson, who also was contacted about license compliance issues last year. "It's because Microsoft's licensing is still very hard to understand."

Paul DeGroot, an analyst at Directions on Microsoft, said that the GGWA should ease "the pain of getting legal" for users. "But I don't see it having an impact on piracy rates," he said.

— Gregg Keizer and Eric Lai

DATA CENTER

Sun Plans to Merge Server, Storage Units

Sun Microsystems Inc. plans to combine its storage and server businesses into a new group called Sun Systems, according to a blog posting last week by CEO and President Jonathan Schwartz.

The realignment comes about two years after the vendor paid about $4.1 billion to acquire tape storage vendor Storage Technology Corp.

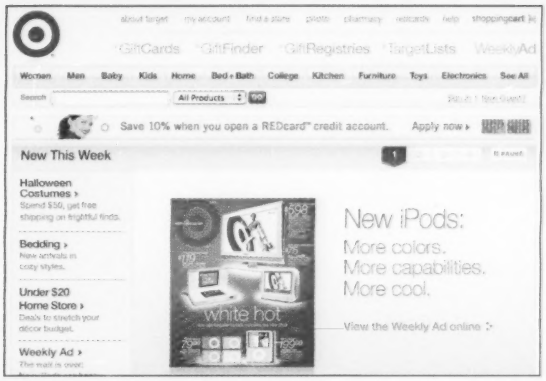
The new business unit will be responsible for aligning the company's server, storage, virtualization and networking technologies, Schwartz said.

Such a combination could ease the process of managing IT systems at Oregon State University, said Chuck Sears, manager of research computing at the school's College of Oceanic and Atmospheric Sciences.

The university runs both Sun servers and storage systems, Sears said.

– BRIAN FONSECA

> **"Can you tell where the server stops, and the storage starts? I can't.**
>
> **EXCERPT FROM** SUN CEO JONATHAN SCHWARTZ'S BLOG POSTING



INTERNET

Target.com Case May Expand Disability Laws on the Web

A FEDERAL JUDGE last week ruled that Target.com, the home page of retailer Target Corp., must be accessible to blind persons under California laws. The ruling could extend state and federal disabilities statutes to the Internet, experts said.

At the same time, Judge Marilyn Patel, of the U.S. District Court in San Francisco, certified a lawsuit filed against Target by the National Federation of the Blind (NFB) as a class action on behalf of U.S. blind Target.com users.

In her memorandum and order, Patel also denied the Minneapolis-based retailer's request for summary judgment in the lawsuit.

The national and California NFB organizations, along with blind college student Bruce "BJ" Sexton, filed a lawsuit last year alleging that Target had failed to make its Web site accessible to the blind and then ignored the issue when confronted with complaints.

The lawsuit contends that Target.com violates the Americans with Disabilities Act (ADA) and two California statutes.

According to Eric Goldman, director of the High Tech Law Institute at the Santa Clara University School of Law, the judge's order concluded that ADA statutes require retailers' Web sites to help blind patrons shop in a company's physical stores.

The judge's ruling found that California state disability laws require that commercial Web sites allow handicapped persons to perform the same tasks as other patrons, Goldman said.

Patel's class-action ruling allows the list of plaintiffs in the lawsuit to include any blind person in the U.S. who has tried to enter Target.com but has been denied access to "the enjoyment of goods and services offered in Target stores."

In a statement, Marc Maurer, president of the Baltimore-based NFB, said that "all e-commerce businesses should take note of this decision and immediately take steps to open their doors to the blind."

— Linda Rosencrance, with Dan Nystedt of the IDG News Service

Short Takes

Sun Microsystems Inc. has patched 11 vulnerabilities in the Windows, Linux and Solaris versions of its Java Runtime Environment and Java Web Start. Copenhagen-based security vendor Secunia APS rated all the patches "highly critical," its second-highest ranking.

Salesforce.com Inc. has created a $25 million investment fund to encourage start-up companies to build applications on its Force.com hosted development platform. Investment companies Bay Partners and Bessemer Venture Partners contributed to the fund.

ERG Ventures LLC has agreed to pay $330,000 in fines to settle a Federal Trade Commission complaint that it hid spyware in software that could be downloaded for free. The software infected 15 million computers, the FTC said.

Microsoft Corp., looking to augment its e-commerce and search capabilities, has acquired Jellyfish.com, a comparison-shopping Web site. Terms of the deal weren't disclosed.

OPERATING SYSTEMS

McBride: Reports of SCO's Death Greatly Exaggerated

IF THE CORPORATE Grim Reaper is truly knocking on the door of The SCO Group Inc., no one seems to have told Darl McBride, the software vendor's president and CEO.

Since early August, SCO has lost a key court ruling in its lawsuit against Novell Inc., filed for Chapter 11 bankruptcy protection and reported weak third-quarter results. But McBride insists that no one should make plans for SCO's funeral yet.

"[There's] the view out there that we're just dead, and everybody's claiming victory over SCO," he said in an interview on Sept. 28. "It's like the Linux faithful are lined up for the bad news. They've got their confetti ready to throw, and everybody's all excited."

"We're moving forward on the merits [of the Novell case], and we have some optimism around all the other crazy stuff that's going on."
DARL McBRIDE, CEO OF SCO

But, McBride contended, it's far too soon to call the final result of the legal battle between SCO and Novell over ownership of the copyrights to Unix. "One bad ruling does not a full legal conclusion make," he said.

In addition, there's a big difference between a Chapter 11 financial restructuring and a liquidation, McBride said.

Raven Zachary, an analyst at The 451 Group, agreed that the naysayers may be writing off SCO a bit prematurely. "They have big customers, like McDonald's," he said. "It's not over yet. Companies come out of bankruptcy."

– TODD R. WEISS

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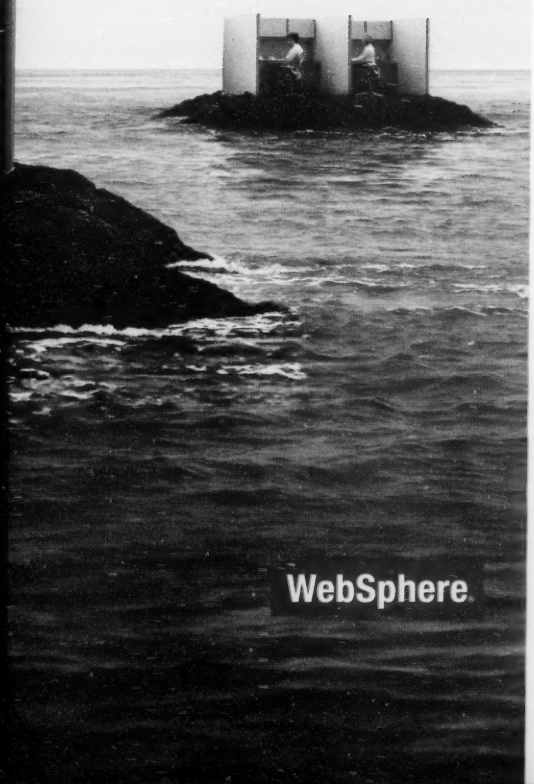


_INFRASTRUCTURE LOG

_DAY 84: Feeling really disconnected. We're not getting the most out of our existing assets. Service and application integration is a nightmare. Our connections are restrictive. We've got to stop working on these islands.

_Please rescue me from this lack of connectivity.

_DAY 87: I've taken back control with IBM WebSphere solutions. Now we can service-enable and connect our existing assets for mission-critical goals. We can reuse existing applications and save money by eliminating redundant systems. Now we're ready for any SOA integration project.

_Plus, no more jellyfish stings.

Download the enterprise service bus white paper at:
IBM.COM/**TAKEBACKCONTROL**/CONNECT

SOFTWARE

Microsoft Sets Its SaaS Sights on Larger Users

CONVENTIONAL WISDOM holds that small companies, not big ones, are embracing software-as-a-service technologies. And until now, Microsoft Corp.'s forays into the SaaS arena via its Live services have reinforced that view by focusing on home users and small and midsize businesses.

But the software vendor is aiming directly at enterprise users with its Online family of hosted services, which it began offering last week.

Only customers that are buying licenses for 5,000 seats or more will be eligible to use the SaaS versions of Exchange, SharePoint and the soon-to-be-released Office Communications Server 2007, said Eron Kelly, director of product management in Microsoft's business online services group.

Kelly said that in an attempt to reassure corporate users about application performance, Microsoft will offer rebates ranging from 25% to 100% of its SaaS subscription fees if service-level agreements aren't met.

Barry Libenson, CIO at Ingersoll-Rand Co., said he hasn't looked closely at SaaS yet. But he agreed that systems such as e-mail servers might be ripe for a conversion to hosted services.

"With the backups, the legal requirements, and the privacy and security issues, there's a lot of stuff to manage correctly," Libenson said. "It's a challenge."

Hosted software makes the most economic sense for companies with fewer than 1,500 users, said Michael Osterman, an analyst at Osterman Research Inc. But, he added, there are scenarios where SaaS can work for some companies with tens of thousands of users.

— Eric Lai

NOW SERVING

LIVE SERVICES

- Are designed for home users, business end users and virtual work groups.
- Include pieces of Windows and Office and a hosted version of Dynamics CRM.

ONLINE SERVICES

- Are aimed at organizations with higher-level IT needs, such as scalability, security and high availability.
- Include hosted versions of Exchange, SharePoint and the upcoming Office Communications Server 2007.

BETWEEN THE LINES *By John Klossner*

LOOK- YOU PROBABLY DON'T UNDERSTAND LICENSING. YOU NEED HELP. YOU MIGHT BE WHAT WE CALL "MISLICENSED."
YOU MEAN LIKE YOU'RE WHAT WE CALL "MISCODED?"
M$oft
GGWP
XP

BENCHMARKS LAST WEEK

Wal-Mart Stores Inc. said it has stopped publishing a toll-free customer service number on its Web site for online shoppers to use. Instead, it expects them to rely on an upgraded version of an online self-help tool.

The National Retail Federation asked credit card companies to stop forcing retailers to store payment card data, a request made one day after the Oct. 1 deadline for complying with the PCI security standard.

25 YEARS AGO: A story that ran in *Computerworld* was headlined, "Few Women, Minorities Study DP."

Global Dispatches

Nokia Siemens To Outsource R&D Work to IBM

ESPOO, FINLAND – Nokia Siemens Networks BV has announced plans to outsource some of its research and development operations to IBM.

Up to 235 employees of the joint venture of Nokia Corp. and Siemens AG will start working for IBM upon completion of the deal, the company said. At Espoo-based Nokia Siemens, they had worked in the service core and applications business unit.

As employees of IBM's Global Engineering Solutions division, they will continue working on Nokia R&D projects as well as projects for other IBM clients.

Nokia Siemens, formed last April, announced a cost-cutting plan this summer that included layoffs of up to 15% of its workforce and the outsourcing of selected R&D projects.

Stephen Lawson,
IDG News Service

EC Launches Probe Of Qualcomm

BRUSSELS – The European Commission last week said it has launched an antitrust investigation to determine whether Qualcomm Inc. abused its dominant position in the market for mobile phone chip sets. The commission didn't set a timetable for completing the investigation but said it is "a matter of priority."

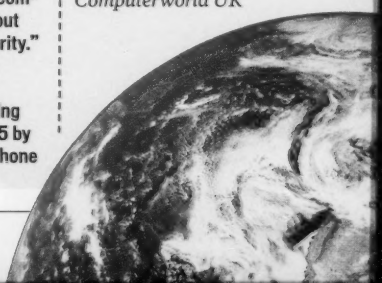
The investigation was prompted by complaints about Qualcomm's licensing practices in October 2005 by Nokia, LM Ericsson Telephone Co., Texas Instruments Inc., Broadcom Corp., NEC Corp. and Matsushita Electric Industrial Co. Qualcomm said its licensing model allowed new vendors to enter the market, resulting in more products and lower handset prices.

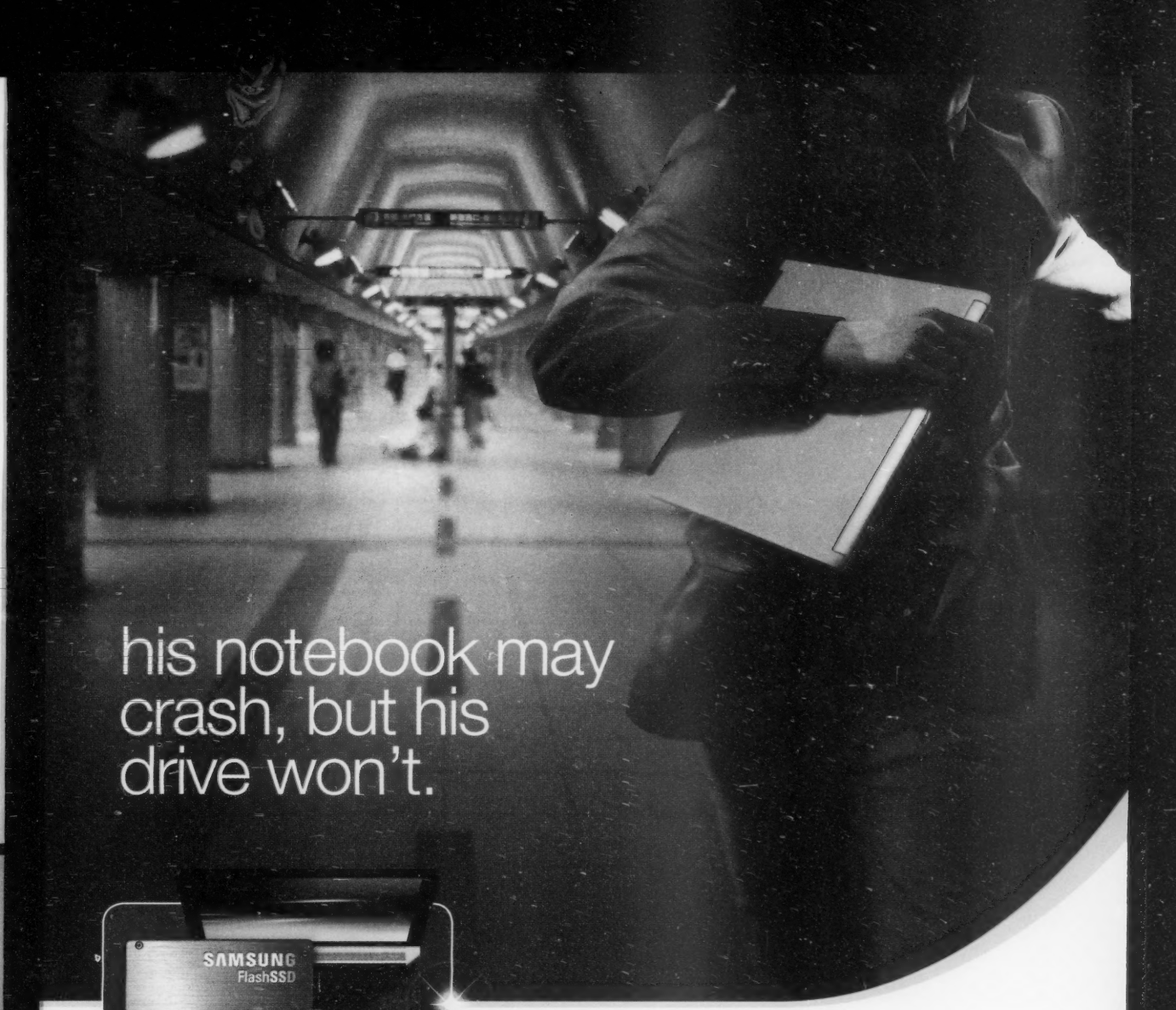
Peter Sayer,
IDG News Service

BRIEFLY NOTED

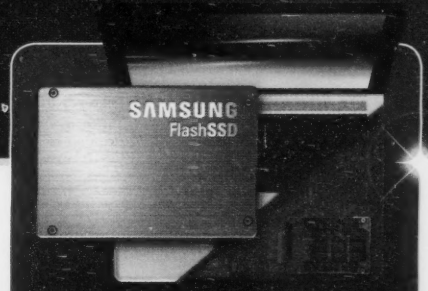
BT Group PLC in London has acquired IT services firm Lynx Technology Ltd. Terms of the deal weren't disclosed. Chesterfield, England-based Lynx employs 500 people, including 200 field engineers and 50 consultants.

Computerworld UK





his notebook may crash, but his drive won't.



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write speed	> 80MB / Sec
active power consumption	< 0.5W
system boot speed[2]	< 24 sec
operating temperature	-25C ~ 85C

[1]Mean Time between Failure
[2]HP NX9420, XP Pro, Core Duo Processor 2.0Ghz, 512MB RAM, ICH 7, i945 Chipset

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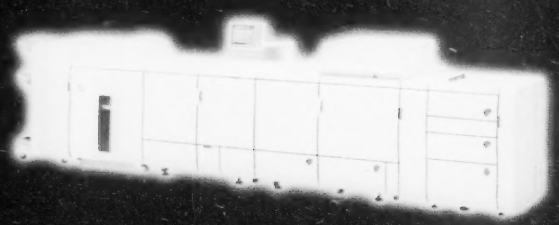

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KEVIN CURRY/GETTY IMAGES

ITIL Gets The Hard Sell — By IT Execs

Managers say workers need to be convinced of the IT blueprint's benefits.

By Patrick Thibodeau

LIKE MANY large companies, Yahoo Inc. is adopting new IT service management processes detailed as part of the IT Infrastructure Library (ITIL) guidelines. One of its goals is reducing the need for IT staffers to repeatedly fix the same system problems — especially during the middle of the night.

"We do perform heroics all the time," said Stephen Carn, Yahoo's manager of data center services. The need to do so "might be just par for the course" for IT workers, Carn said. But he added that there's a heavy price to pay "in terms of turnover and burnout."

Carn sees ITIL, an IT operations blueprint that is overseen by the U.K. Office of Government Commerce, as a potential solution.

But he said at the IT Service Management Forum USA's annual conference in Charlotte, N.C., last month that he first had to sell the new approach to higher-level IT executives at Yahoo as well as his 400-person staff. Winning over the latter group in particular required some internal marketing, according to Carn.

Other attendees also cited the need to convince IT workers of the benefits of service management programs as a key challenge they face when promoting the adoption of ITIL methodologies at their companies.

David Farris, IT manager at the U.S. Department of Agriculture's Animal Plant Health Inspection Service, has been working for five years to change some of the processes within his 300-employee organization. He hopes to generate significant savings in the IT department, which now spends about $100 million annually.

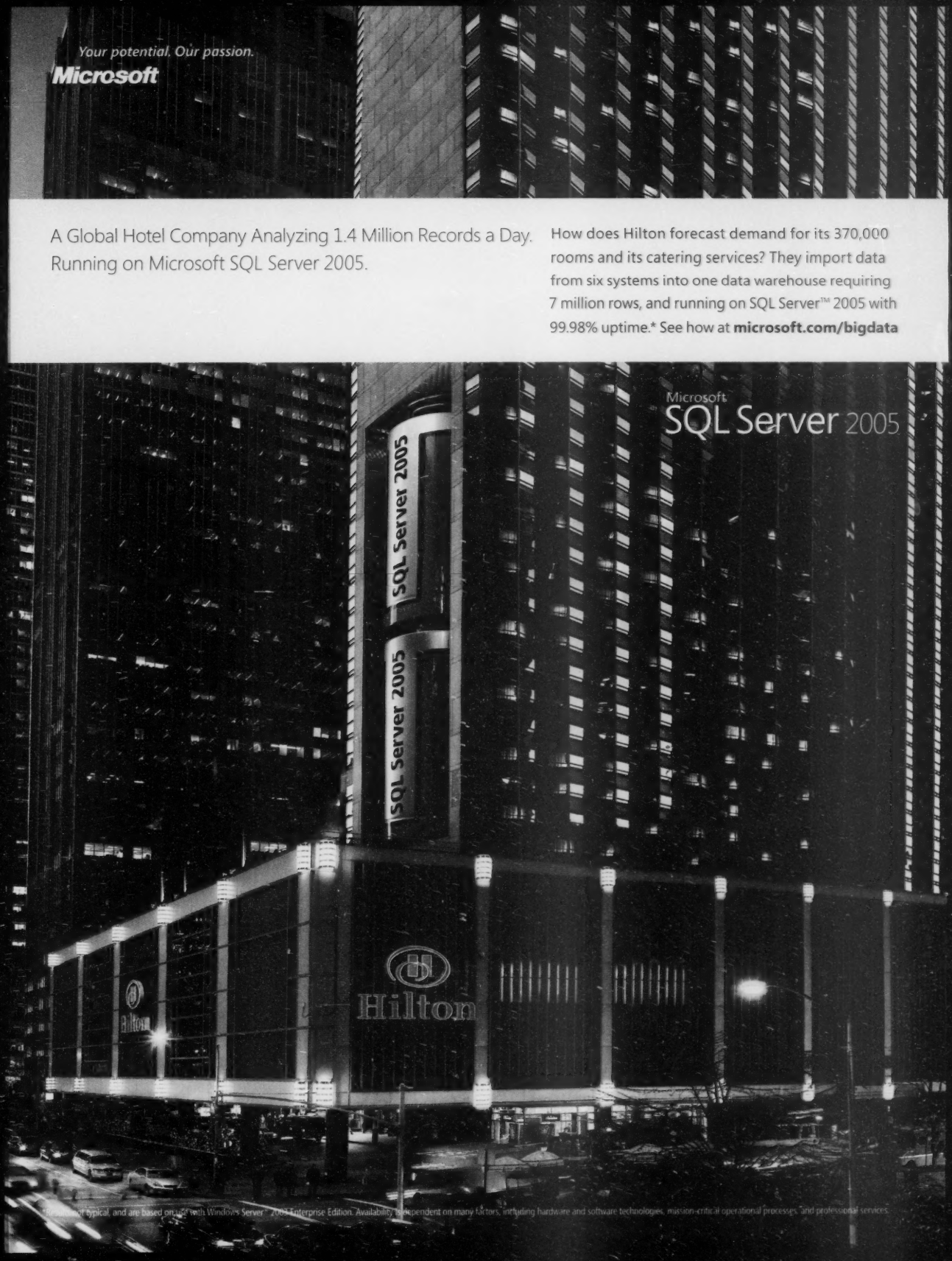
For several years, a lack of active support from upper management made it hard for Farris to push ahead with the ITIL-based processes. A new CIO finally backed the project, but Farris said getting his employees to accept the changes has also been a challenge.

The IT staffers "are comfortable with what they're doing," he said. "They have their own processes, their own incident management tools. It's their baby."

At Yahoo, Carn quickly found a way to illustrate to his bosses how the service management concept works, thanks to an application that kept crashing. He asked IT staffers to fill out incident management forms detailing each crash, then he created a timeline and put the data from 17 incident reports into a spreadsheet — all with the goal of finding and documenting the root causes of the crashes.

Carn discovered that nine of the crashes were caused by an outdated Dynamic Link Library file. He showed the results of his investigation to senior IT managers and demonstrated the methods he used to track down the problem. It "really resonated" with them, he said.

Continued on page 18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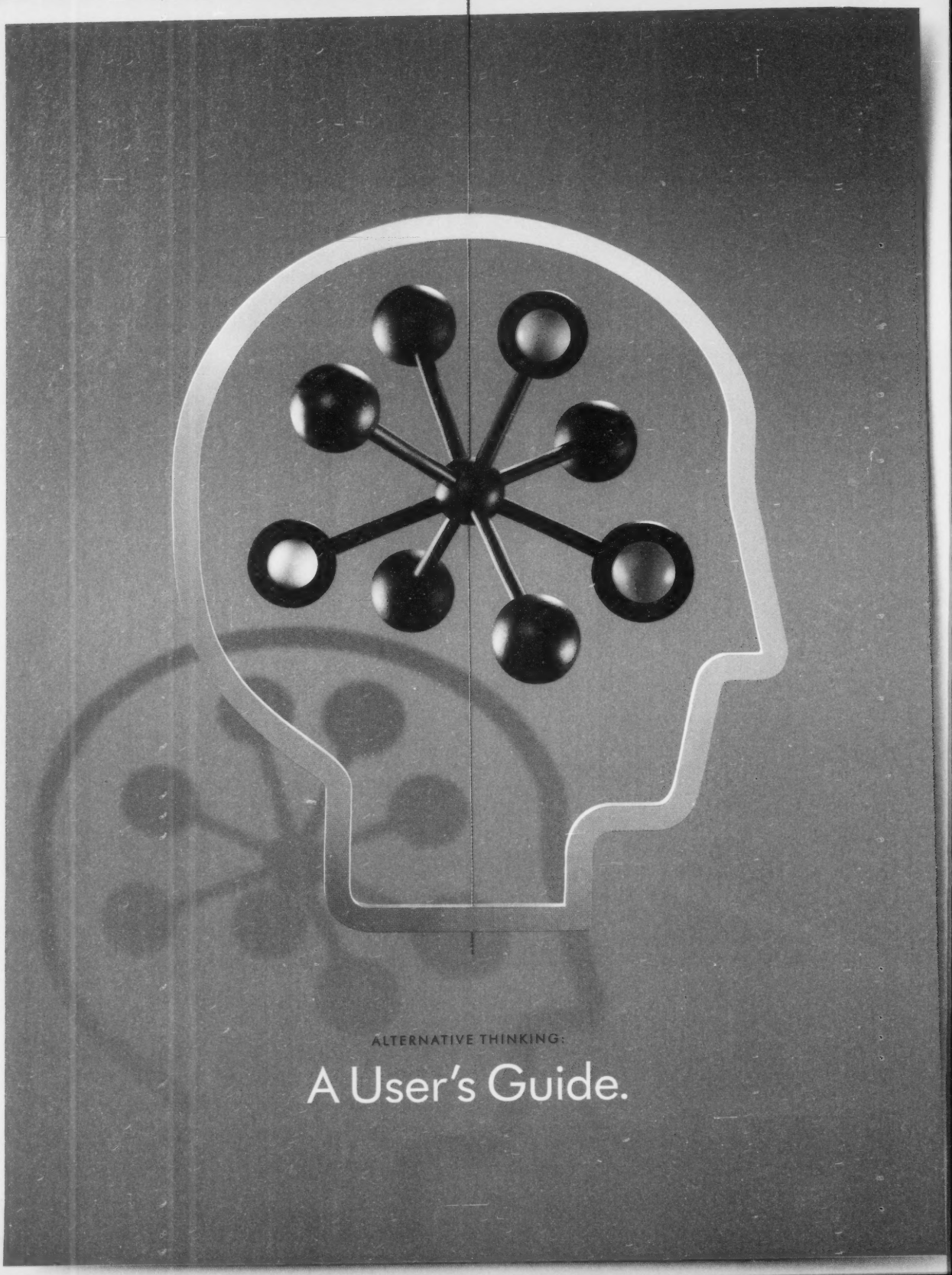
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Continued from page 14

But Yahoo's IT staffers weren't as immediately enthusiastic as the managers about adopting ITIL processes, Carn said. To help sell the idea to his workers, Carn dubbed the service management effort "ITopia" and created handouts, cartoons, T-shirts and even Frisbees to help explain the program and get people interested in it.

In a workplace culture that thrives on e-mail and instant messaging, Carn opted for the printed handouts because they created opportunities for face-to-face interaction. "I wanted to build a relationship with people," he said.

The service management program was launched last October, and many of the new processes have now been implemented. The next hurdle, Carn said, is to add supporting tools that can help increase productivity by further automating data center operations.

Kurt Milne, managing director of the IT Process Institute in Eugene, Ore., said that modifying systems to fit within ITIL processes can be difficult. In addition, ITIL requires changes in the "cowboy culture" that exists within many IT departments, Milne said.

"Historically, people have been rewarded for putting out fires," he said. "What you want to incent is people who avoid problems in the first place."

More and more IT staffs likely will have to adapt to ITIL's specifications, because the guidelines are spreading as companies seek to instill uniform IT management processes.

One indicator of the increasing interest in ITIL is a sharp rise in the membership of the ITSMF USA, which advocates that companies adopt the guidelines. Two years ago, the Pasadena, Calif.-based group had fewer than 3,000 members. Now it's up to about 8,000, and ITSMF USA officials think the membership count could reach 20,000 by 2010.

"I wanted to build a relationship with people.

STEPHEN CARN, YAHOO IT MANAGER, ON USING FACE-TO-FACE INTERACTIONS TO SELL ITIL INTERNALLY

And according to a recent survey of ITSMF USA members, about 19,000 IT service management jobs have been created thus far this year. In comparison, the survey results showed that there were about 5,000 new jobs created last year and 500 the year before that.

About one-third to one-half of the job demand is coming from consulting firms and IT vendors, said Sue Conger, an associate professor at the University of Dallas who directs an MBA program with a concentration in IT service management in the school's College of Business.

But the job growth also is partly due to the adoption of ITIL by large users. For instance, General Motors Corp. last year used the guidelines to create a single worldwide IT service desk. And the Canadian government is implementing ITIL-based processes across its entire IT operations.

Jim King, who heads the service management improvement program for the IT services branch of the Canadian government, stressed the importance of team-building as part of ITIL implementations.

King suggested holding training "boot camps" to get IT staffers to work together on the new processes. "You can't do this unless you pay attention to people," he said.

Technologies designed to help ease the cultural shift for IT workers are becoming available.

For instance, G2G3 Propulsion Ltd. in Edinburgh has developed a game-like system for teaching service management processes. The system, called PoleStar ITSM, displays interactive models of processes, including one that shows how teams of IT workers should interact when handling server failures.

Christian Diotte, a senior manager for systems integration at T-Systems North America Inc. in Rochester Hills, Mich., saw a demonstration of PoleStar ITSM at the ITSMF USA's conference. Diotte said that getting IT staffers to accept service management methodologies is critical. If people don't buy into the process, he warned, it will never work. ■

Not Sold on ITIL? Alternatives Exist

ALTHOUGH ITIL may be the most popular IT service management guideline, it isn't the only approach that's available for standardizing data center operations.

For instance, ITSMF USA co-founder Ian Clayton has helped form another organization called the Service Management Institute. Clayton said the Elk Point, S.D.-based SM-I is promoting IT service management methodologies that are focused on the individual – what IT managers and workers need to do their jobs.

The role-based approach predates ITIL, according to Clayton, who said it details IT "knowledge areas" and the competencies that they require. One example is a service delivery management knowledge area encompassing tasks such as service-level, asset and security management.

Clayton criticized the ITSMF USA for letting vendors serve on its board, arguing that that policy creates a conflict of interest. Members "are getting marketed to," he said, adding that the SM-I won't be run by vendors.

But ITSMF USA board member Michael Cardinal said many of the group's vendor representatives are service management practitioners, not salespeople. "I don't think you can have one part of your organization excluded [from the board]," said Cardinal, who works as a business analyst at State Farm Insurance Cos. in Bloomington, Ill.

– PATRICK THIBODEAU

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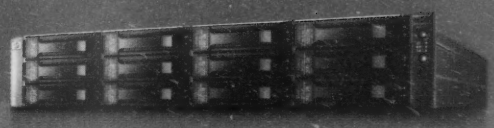

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Corporate BI Projects Face Skeptical Users

IT managers must also prove to execs that the technology offers strong ROI.

By Heather Havenstein

LAS VEGAS

While the notion of "democratizing" business intelligence has been bandied about for years, only recently have many IT operations moved to include end users in BI plans.

Users attending *Computerworld*'s BI Perspectives conference here late last month said that IT managers can still face a difficult time convincing users that BI tools are beneficial, and corporate executives that the technology offers a strong return on investment.

Jim Livingston, interim CIO of the University of Utah Health Care system, said that his organization only recently "hit the mark with what the users wanted" — 14 years after the first BI tools were installed at the Salt Lake City-based health care provider.

Users were reluctant to adopt BI until IT added tools to let them create personal reports and dashboards, said Livingston.

Previously, he said that users "felt like IT was a bottleneck to creating reports." Now, BI adoption "has gone through the roof," he added.

An informal survey of attendees at the conference indicated that many firms are still seeking ways to get users to adopt BI tools and processes. About 60% of those polled said that less than 15% of users in their companies use BI tools.

Calvin Johnson, director of the research and evaluation office at the District of Columbia's Court Services and Offender Supervision Agency, said that his office initially focused its BI effort on providing information to the executive who first agreed to fund the project.

At the time, though, IT managers knew that unless the tools were quickly made available to end users as well, the BI effort would "backfire," Johnson said.

"When you think about developing a [BI] solution, it has to be flexible enough that it can capture the attention of the line staff and keep them motivated," he said.

Johnson advised his fellow IT professionals to use internal BI champions to convince users of the benefits of the technology. Such a strategy has been so successful at his agency that BI data is now used for virtually all analysis.

Guido Sacchi, CIO and senior vice president of corporate strategies at CompuCredit Corp., warned that companies should avoid forcing BI tools on users, since that could create an impression of IT as an "evil empire" controlling the business with an iron fist.

CompuCredit moved to prove that BI information is reliable by letting users view it as a "data supply chain" that tracks data from its capture through storage and the extract, transform and load processes and onto its presentation.

The Atlanta-based financial services firm also promotes user buy-in by aligning BI projects to very specific end-user needs.

For example, a recent project focused only on improving the speed of queries that access the freshest data available, he noted. "Focusing on exactly the parameters of performance that are important to users helps foster adoption," he said.

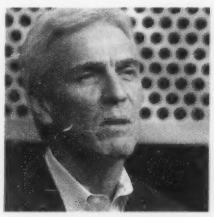
Robert Fort, CIO at Virgin Entertainment Group Inc. in Los Angeles, said that his company moved to include end users in its BI efforts from the planning stage.

"[Sales associates] are the people who actually have the opportunity to influence the [revenue] numbers," Fort said. "We gave [sales data] to them on a real-time basis. In the middle of day, they can see if they are making their sales plans. [If not,] they can change their behavior."

Executives suggested that IT managers prove ROI by keeping track of any revenue gains that can be traced to the use of BI tools.

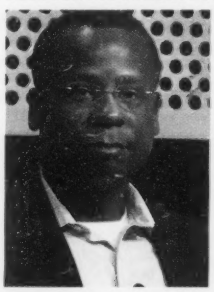
Fort noted that after installing the BI tools, Virgin's annual sales increased by $18 million. IT managers determined that 20% of the increase could be attributed to the use of BI tools.

Spencer Taft, BI group manager at Cox Enterprises Inc., said that a BI project at his company uncovered $250,000 in uncollected revenue, and his group is using that information in its efforts to promote other BI projects. ■



"We gave [data] to [sales clerks] on a real-time basis. In the middle of day, they can see if they are making their sales plans.

ROBERT FORT, CIO, VIRGIN ENTERTAINMENT GROUP INC.



"When you think about developing a [BI] solution, it has to be flexible enough that it can capture the attention of the line staff and keep them motivated.

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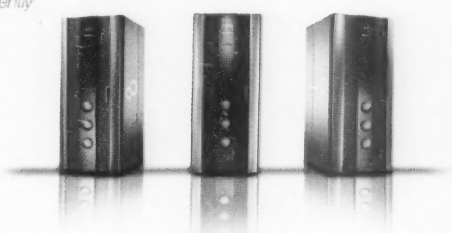

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On the Mark

HOT TRENDS ■ NEW PRODUCT NEWS ■ INDUSTRY BUZZ BY MARK HALL

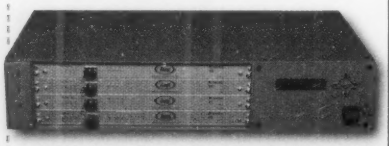
MATTHEW FAULKNER

Put the Internet in a Box

DEPLOYING IP-BASED applications across the Internet is simple. Testing how well they'll perform is a bit trickier. After all, how do you mimic the Internet?

Turns out it's not so difficult for the folks at Anue Systems Inc. in Austin. According to Kevin Przybocki, chief operating officer, Anue's Network Emulator software running on its GEM appliance is, in effect, "the Internet in a box." He says the custom hardware/software combination creates a virtual Internet, with all its digital warts, so you can evaluate how well your software will run when it encounters different Internet-based impairments, such as varied bandwidth or jitter. The company's product can be used with other testing tools, such as load-testing software from San Ramon, Calif.-based RadView Software Ltd., which emulates the number of users on a system.

Currently, the Network Emulator uses canned application data to test loads. Przybocki says that later this month, Anue's 1Gbit/sec. GEM appliance will be able to capture live data from an application and use it for tests. And in November, Anue will add that capability to its 10Gbit/sec. device. Przybocki says the amount of live data you use for a test is dependent on the external storage you supply. Each appliance can store and replay about 10 to 20 seconds of live data. Pricing starts at $20,000.



» Anue's appliance is designed to let you test apps as if they were running over the Internet.

Crank Up Any IP App

Akamai Technologies Inc. is well known for boosting the performance of browser-based applications. This week, the Cambridge, Mass.-based company is rolling out its IP Application Acceleration service for apps that use more Internet protocols than just HTTP, such as voice over IP and Web services. Neil Cohen, senior product marketing manager, says that although IT shops are increasing their dependence on the Internet to run their software, CIOs are still bound by service-level agreements that require adequate performance. Cohen claims that the new Akamai service keeps applications running in top form by ensuring that packets travel along the fastest, and not necessarily the shortest, path between destinations. To use the service, you are only required to house an Akamai-installed and -maintained gateway on-site to connect to the 25,000 Akamai acceleration servers the company has deployed across the global Internet. No data center or client-side software is necessary. Pricing is application-specific.

Cohen: Akamai's new service speeds online apps.

To PDF or Not to PDF?

Where do you stand on PDFs? Some companies love Adobe Systems Inc.'s immensely popular document format, says Brent Gaynor, vice president of marketing at Docudesk Corp. in Plano, Texas. But others are less than enamored of it, preferring, say, the OpenDocument format or Microsoft Office. PDF fans have long been able to use Docudesk's DeskPDF client software, which can turn any file into a PDF. Now the company is doing something for fans of other formats with next week's release of the ungainly named DeskUNPDF Professional, which lets you convert PDFs to other document formats. Gaynor claims that DeskUNPDF lets you keep true fidelity to the original document format, including fonts, spacing, bullet points and all manner of styles. What's more, end users have a batch-mode option so they can render entire directories of documents into their favorite format from PDF (or vice versa, if they're using DeskPDF Professional). Pricing starts at $59 a copy. ■

You can make or unmake PDFs with Docudesk's tool, Gaynor claims.

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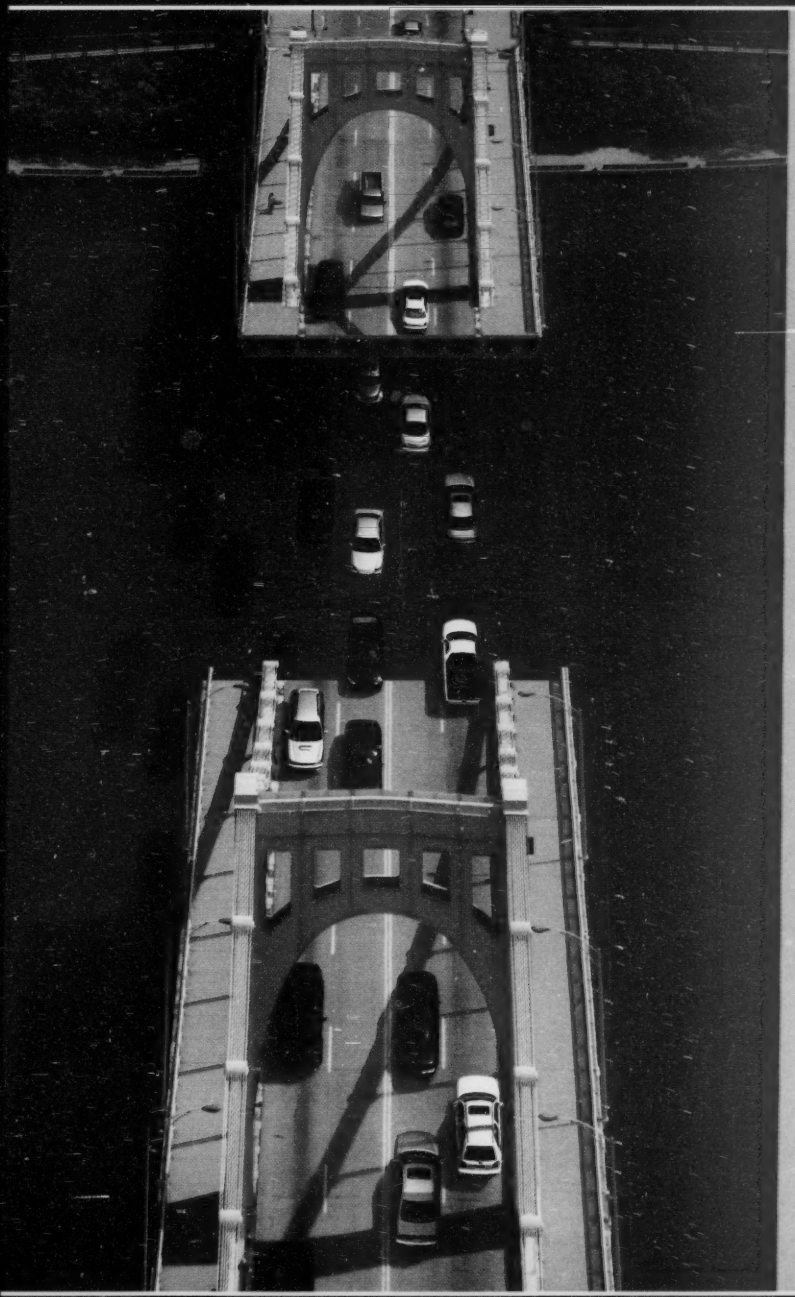

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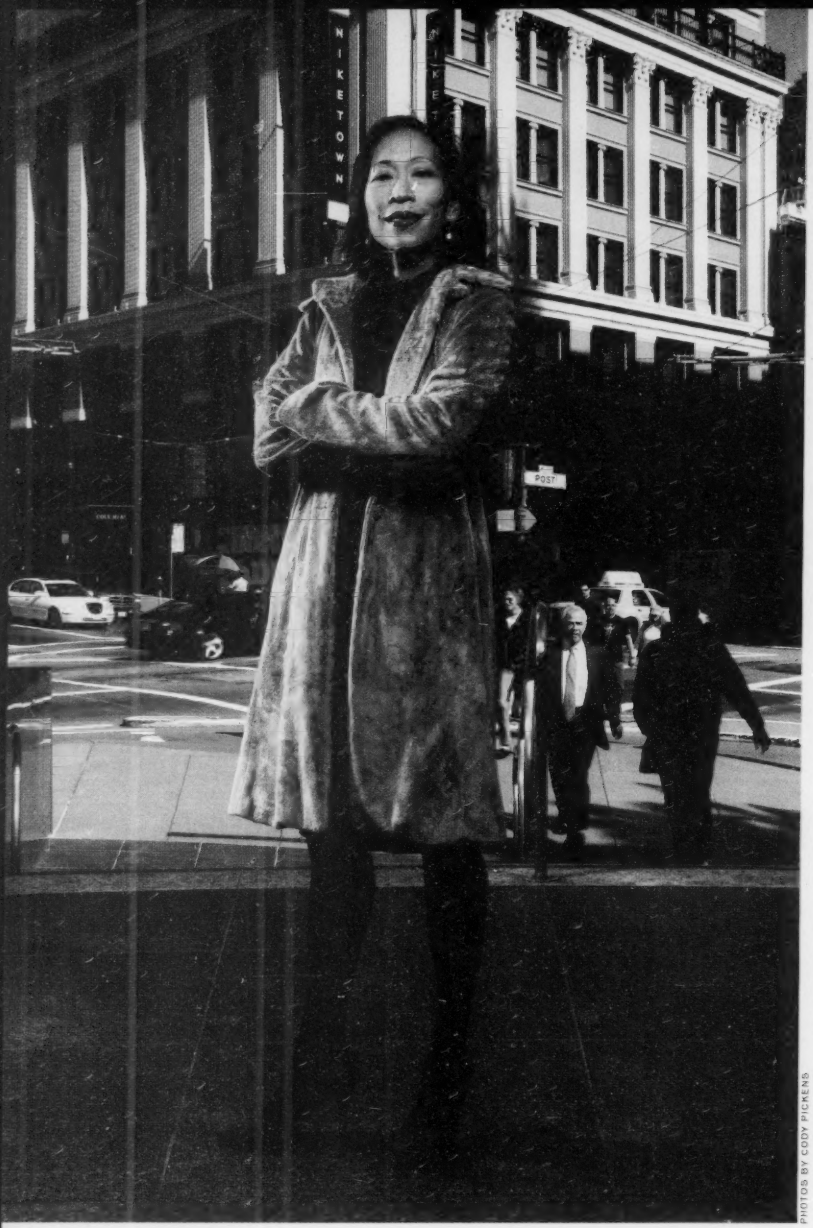

PHOTOS BY CODY PICKENS

Dossier

Name: Esme Vos

Title: Founder, MuniWireless.com

Organization: MuniWireless.com

Location: Amsterdam

The most interesting thing people don't know about her: "I'm a shoe freak. I have over 80 pairs. I'm also Filipino, where I lived until 17 before I immigrated to the U.S. and went to UC Santa Cruz and then Harvard Law School."

Favorite nonwork pastime: "Cooking. I cook a lot of Italian."

Role model: "A woman named Alexandra David-Neel, an explorer in the 1920s who walked a long distance to Lhasa, China."

Favorite vice: Ice cream

In high school, she was: A bookworm

■ THE GRILL

Esme Vos

The **founder of MuniWireless.com** talks about how things go wrong in muni Wi-Fi, **why the EU does it better** and **who should bear the risk for liberating a city.**

Esme Vos, founder of MuniWireless.com, is a lawyer by training who started blogging about municipal wireless in 2003. The blog became MuniWireless.com, a worldwide aggregator of information about the industry.

What do you think of recent reports of delays and problems with technology and politics in various municipal wireless projects? Lots of people set up pilot programs with different configurations that don't work, and that becomes news. But you undertake pilots to find the problem areas. Suburbs with a lot of trees act kind of like walls and get in the way of wireless signals, and some set up pilots in the winter without leaves, so it's those kinds of errors that account for many of the delays. [Cities should] set up three pilots with different technology, in the hills, in downtown congested areas and near students to see what happens when you upload or download large files.

Continued on page 28

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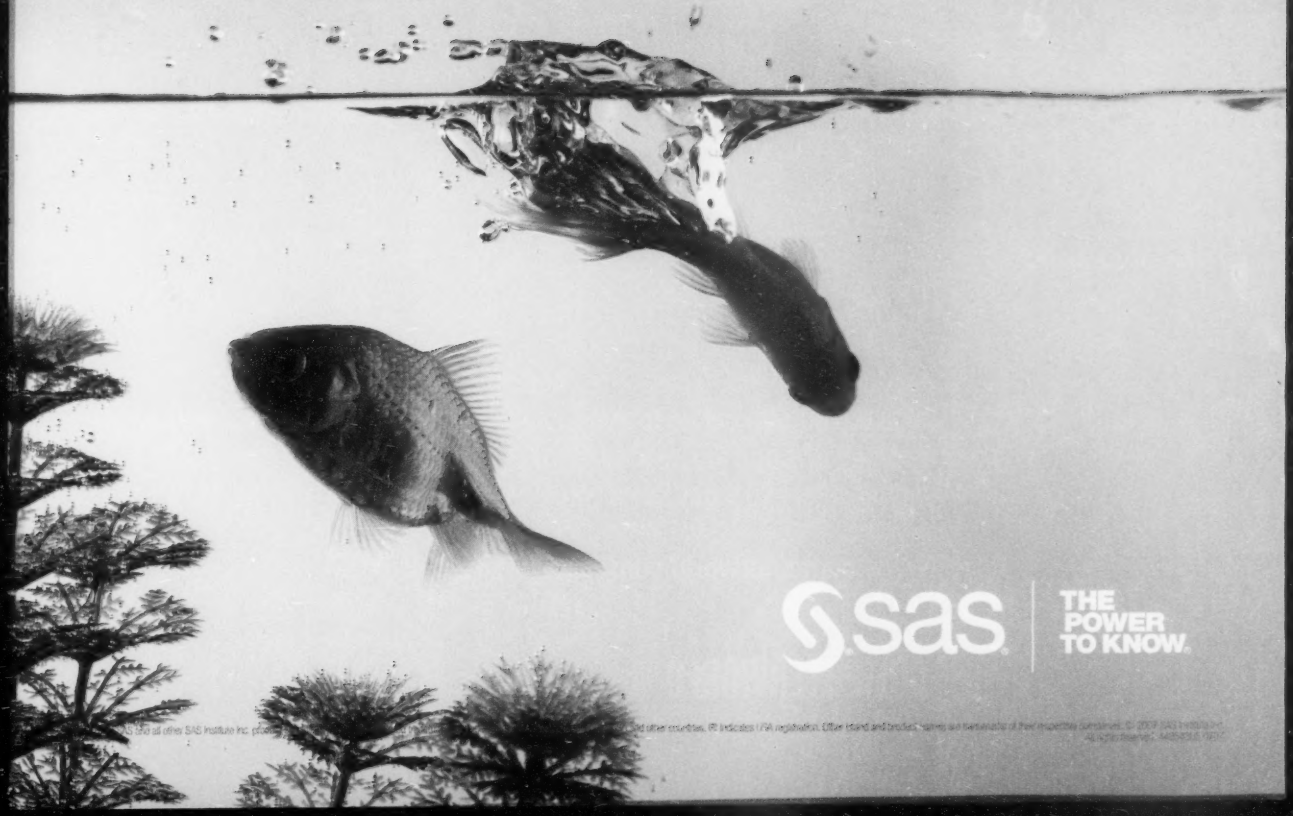

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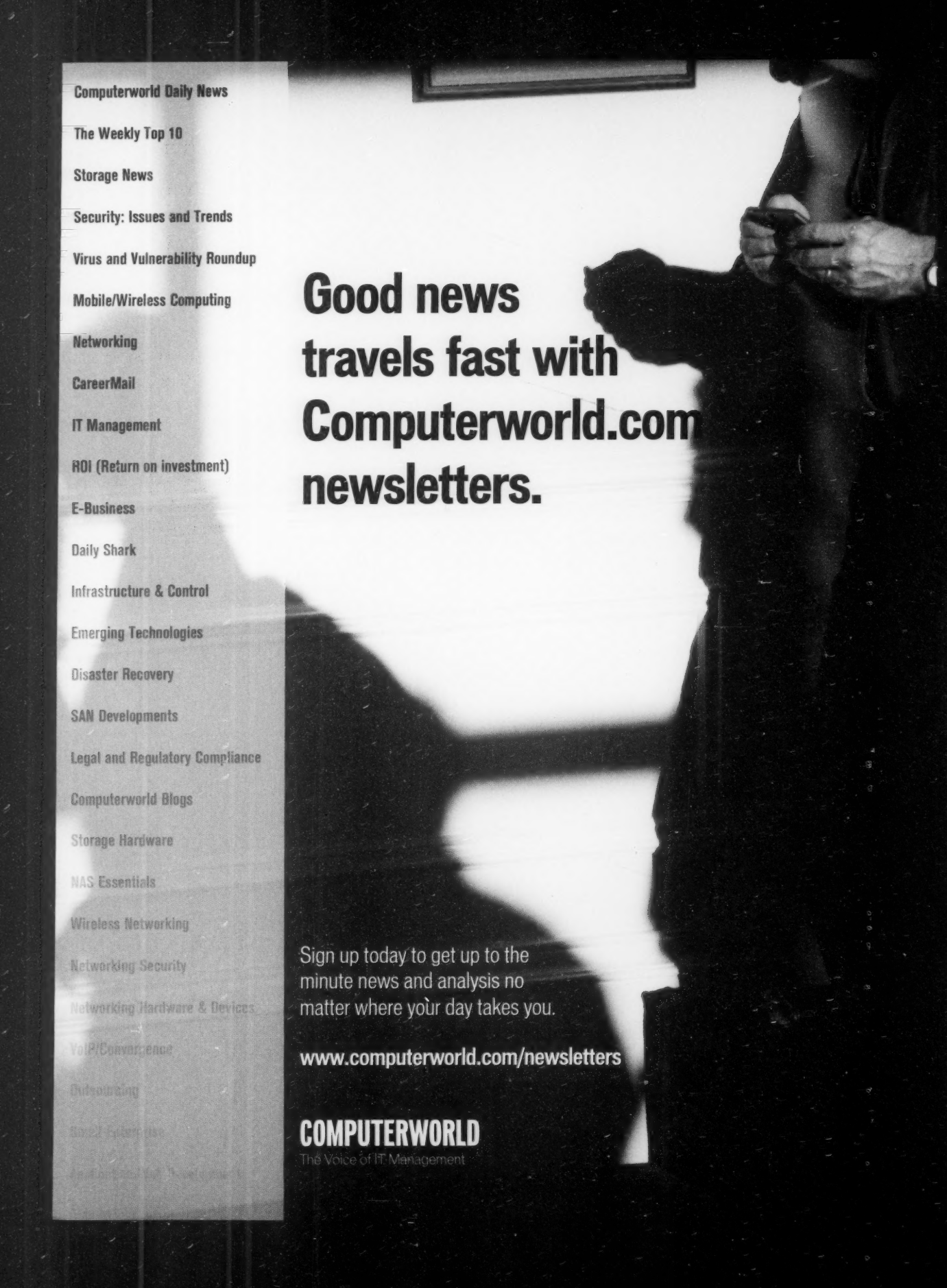
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"There are no fatal flaws for municipal Wi-Fi systems."

ESME VOS, FOUNDER, MUNIWIRELESS.COM

Continued from page 24

But there are some reports of cost overruns. In light of the total growth, how serious are they? Not very serious. Philly's and Portland, Oregon's problems are more or less limited to pilot areas. That says something — that they have an incentive to fix it first before deploying over a larger area. You'd like to make all the mistakes in a pilot and fix it before rolling out to other areas. There are no fatal flaws for municipal Wi-Fi systems.

What about the San Francisco and Chicago municipal Wi-Fi problems that materialized in August? The two cities had the misfortune of having chosen a partner who was clueless in the business. For a long time, analysts have been wondering why EarthLink persisted with the hopeless Helio [a struggling mobile virtual network operator]. Helio, not muni Wi-Fi, has been EarthLink's downfall. Their muni Wi-Fi plans just got dragged into the mess.

Are the main causes of delays governmental, economic or technical? The technical problems are what we see upfront. Many lamp posts, where Wi-Fi antennas might be attached, are owned by electrical utilities, so we saw a big issue with Southern California Edison and access to poles, but that's now turned around. The economic risk that a private provider faces is immense, perhaps $40 million, so why can't the municipality bear half the cost? Why should an EarthLink bear all the risk, when cities are creating an infrastructure with public benefit? We wouldn't have the private sector build all the roads, and Wi-Fi is similar.

Maybe cities should be building their own fiber and wireless networks and selling access to private wholesale operators who then sell access to retail operators. But cities want the easy, cheap way out, so they went the other way, and here we are.

You say on your site that spending on municipal wireless will hit $460 million in the U.S. in 2007. Will recent negative publicity lower that number? We'll do a survey in [the fall], where we'll ask hundreds of municipalities what their spending patterns are. When I talked to vendors at a June conference in Boston, a lot were saying they are getting resistance, and city officials are more reticent to move forward with municipal Wi-Fi. So, the rate of growth of these systems might go down a little bit in the next report.

Can you state roughly what a midsize or large city project would cost? Boston is saying such a system might cost about $15 million. I think that's too low. For Tucson, Ariz., [a consultant] said it would cost $40 million to $56 million to set up a Wi-Fi network. That's high, but several things were included. The $40 million was low-density Wi-Fi, and the $56 million was high density with a lot of Wi-Fi nodes. Now consider this: Tucson has 500,000 people, but it's very spread out, while San Francisco has 800,000 people, but it's very dense. In an interview with the *San Francisco Chronicle*, EarthLink said it would cost $17 million to $20 million. So that's a big difference in the cities.

Apparently, the European Union is promoting broadband, and Wi-Fi is a popular option. Is that because many countries have a more socialistic attitude about this technology? Yes, yes. In the Nordic countries, there's a public communications infrastructure, for example. The city owns the utility and had always delivered electricity, so when it finally came time to build the communications infrastructure, it was all coordinated by that central utility. There, the cities don't offer the actual service; a private enterprise comes in to offer the service, so people have plenty of choices. The U.S. allows more private competition, but it creates a paradox. You see that people are burned by the cable companies and they just seem to raise rates, and sometimes it's just one provider.

Some city officials are concerned about installing Wi-Fi and then having to upgrade to WiMax technology later on. Should they be concerned? All vendors make their gear upgradable, so this becomes a negotiating point. I don't find it a problem. All the vendors right now are selling proprietary hardware, and it has to be more interoperable at some point.

— *Interview by* **Matt Hamblen**

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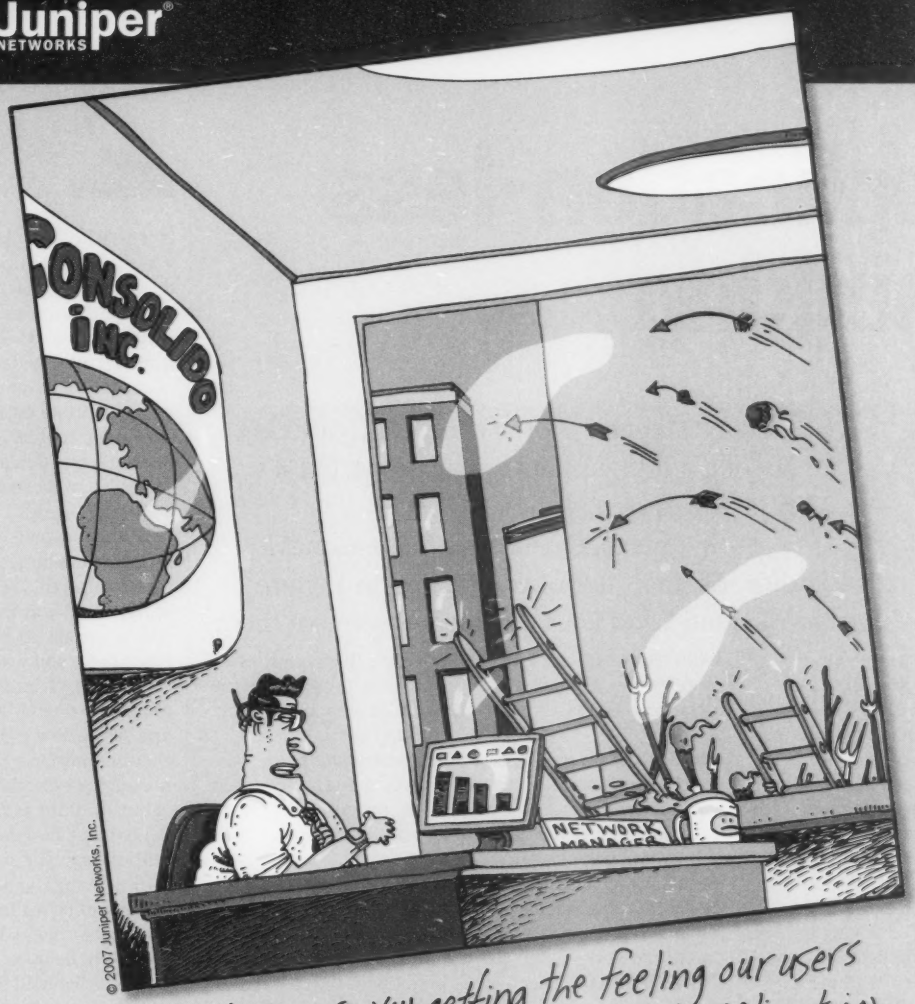

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■ OPINION

Bruce A. Stewart

Application-less Thinking

WE DON'T spend a lot of time in IT thinking about a world without applications, but it's time we started.

At first blush, the idea seems reasonable enough. It's easy, for instance, to draw a picture on a whiteboard of a network cloud filled with services — some of them building on external services and providing for particular local needs, some of them simply purchased as they're used — and a set of clients interacting with them. Look more closely at that picture, though, and you'll probably find that some application thinking has crept in. Did you truly draw an application-less picture, or did you end up implying that the services are applications?

This is why the document-centered interface that was a part of OS/2 was almost never used as the designers expected and why Apple's OpenDoc layer for Mac OS never took off. The intention was that we would completely ignore the underlying applications — indeed, they would be applet bits, combining as needed to get the job at hand done, perhaps never configured the same way twice. But we users kept thinking that we were double-clicking a textual document to get our word processors to open. We stayed in the application mind-set.

Today, organizations are striving to deploy service-oriented architectures. But if we don't figure out how to break the application mind-set, we can't extract the latent value in designing and deploying services on our networks.

One of my clients is wrestling with this issue and discovering that users aren't getting the message. It's as if the message were being delivered in a foreign language, and users are using a tin-eared translator that turns everything the client's IT people say into "application." It makes discussing an application-less future difficult.

■ Users have a tin-eared translator that turns everything into 'application.'

Here's an example of what they proposed to the business people:

"Suppose that, when customers phone the call center, instead of running them through a script, we listen to them first. They tell us about the problem. We open up what looks a lot like a blank page. It's connected to a service that offers suggestions that might help the call center operator. As the problem is described, this service suggests what to ask, or where to steer the conversation. Eventually, we have most of the problem described. We've yet to ask any of the standard identification questions, but that's one of the suggestions. So now we say, 'Can I just get some information from you?' We start to capture things in the order the customer uses, and more suggestions appear; if the user gives us his telephone number, for instance, a service looks it up and suggests his address, so we just ask if this is where he lives. Meanwhile, other services have analyzed the issue and perhaps offered a solution, estimated a service call time or suggested some other action that might be appropriate. Still other services might be offering our latest deals that might be applicable to the customer's needs."

With your own experience as a customer, you might think this is a pretty enlightened way to deal with someone. As the business client, you want to ask things like, "Don't we need to verify who they are first?" and "How do we get their account number?" That's linear, process-driven application thinking in action.

Learning how to think without applications and how to bring the business along will be difficult. The payback in the marketplace will be immense. Each service will be able to grow organically: low-cost updates, and no more massive changeovers ever again, plus a very natural way to approach customers and suppliers in ways that humans work. Mastery of application-less thinking is IT's next challenge. Are you up for it? ■

Bruce A. Stewart *is CEO of Vancouver, British Columbia-based Accendor Research Inc., an advisory services firm focused on management issues in the technology-enabled enterprise. He can be reached at bruce.stewart@accendor.com.*

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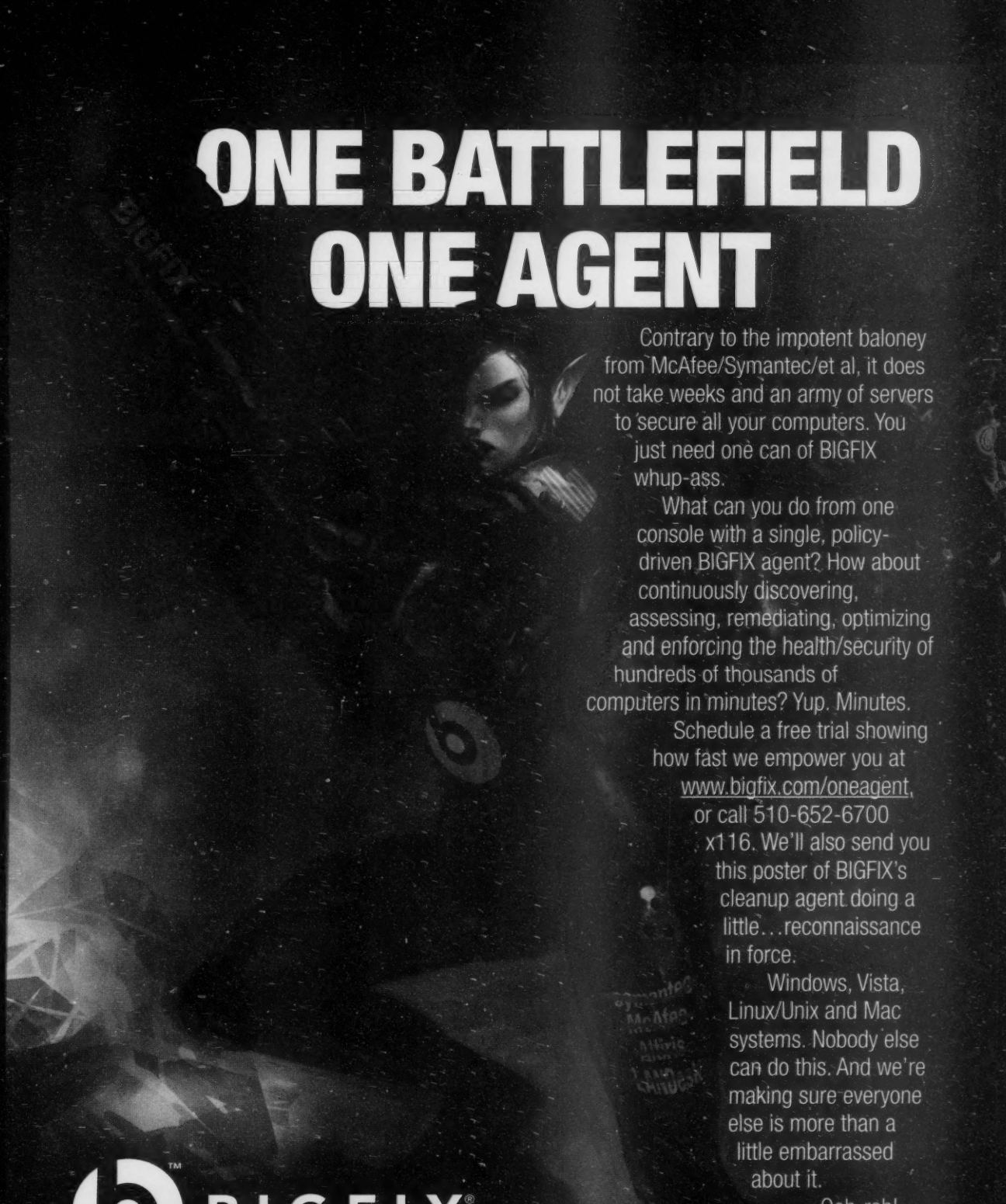

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Storage on Trial

If your company is faced with a lawsuit, you could bear the burden of retrieving documents quickly. Here's how to be the hero.

By Stacy Collett

WHAT IS A data-retrieval plan worth to a company caught up in litigation? For Morgan Stanley, $15 million.

In 2006, the Wall Street firm agreed to pay that sum in fines to resolve an investigation by U.S. regulators into its failure to retain e-mail messages.

E-mail played a central role in the (later overturned) $1.58 billion judgment in favor of Ronald Perelman in the case of *Morgan Stanley v. Coleman*. Perelman is a billionaire investor who said he was defrauded by the firm over the sale of a business. The judge, frustrated by Morgan Stanley's inability to produce e-mails demanded by Perelman's lawyers (the firm said backup tapes had been overwritten), took the unusual step of shifting the burden of proof to Morgan Stanley, so that the firm had to prove its innocence.

The case was sobering for some, but the vast majority of companies still aren't getting the message. In fact, in one survey, some 94% of those responsible for e-mail policy said they don't feel their organizations are fully prepared to meet the revised Federal Rules of Civil Procedure (FRCP), which require companies to be able to quickly find electronic data when ordered by a federal court. The survey was conducted by archive outsourcing firm Fortiva Inc. three months after the new requirements took effect Dec. 1, 2006. In another finding, only 38% of the 118 respondents said they were familiar with the changes.

Companies in regulated industries, such as financial services, health care, pharmaceuticals and telecommunications, are more likely to find themselves in the cross hairs of lawsuits, but all U.S. companies risk an e-discovery legal challenge. More than 60% of organizations have been ordered by a court or regulatory body to produce corpo-

Million-Dollar E-mail

Key dates in the case of *Morgan Stanley v. Coleman*

MAY 2003: Billionaire investor Ronald Perelman files suit against Morgan Stanley alleging that the Wall Street firm's advice to accept Sunbeam stock as partial payment on the sale of Perelman's company Coleman was part of a conspiracy to defraud him.

MARCH 2005: Morgan Stanley lawyers fail to comply with requests to produce e-mail evidence, prompting in a pretrial hearing a partial summary judgment in favor of Perelman, thus shifting the burden of proof to Morgan Stanley.

APRIL 2005: Perelman testifies.

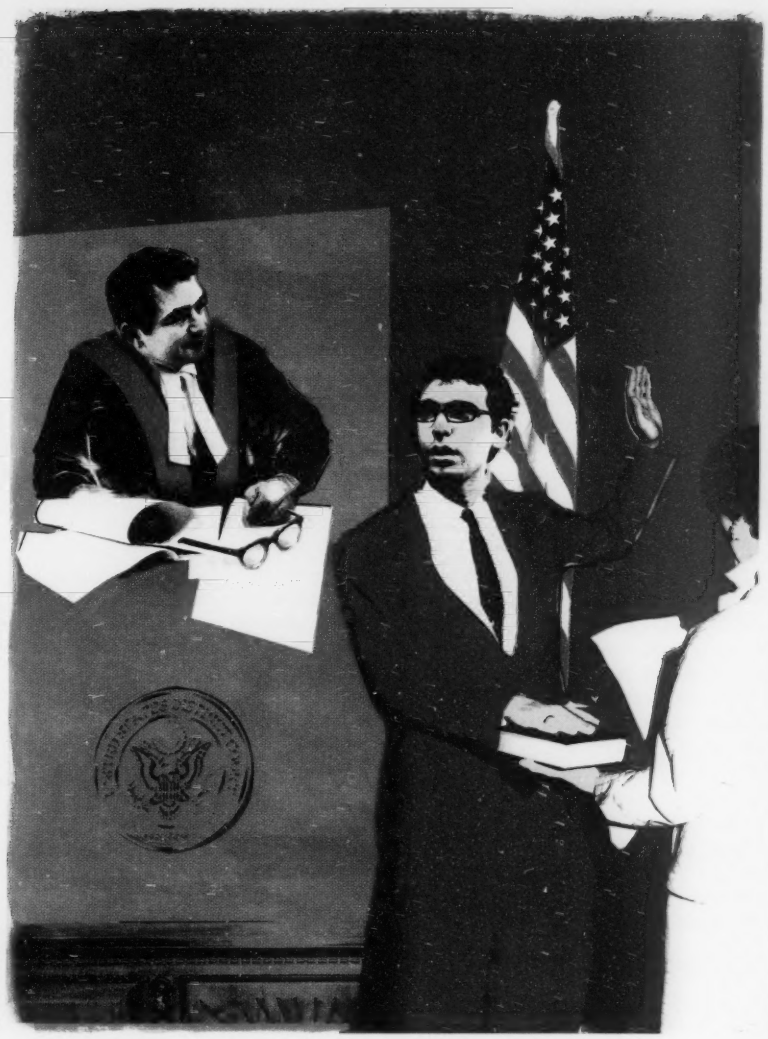
MAY 2005: A jury hands down a judgment in the case, which is later raised to $1.58 billion, in favor of Perelman.

DECEMBER 2005: Morgan Stanley files an appeal.

FEBRUARY 2006: Morgan Stanley agrees to pay $15 million to resolve an investigation by regulators.

MARCH 2007: An appeals court throws out the $1.58 billion judgment.

SOURCES: LAW.COM, *THE WALL STREET JOURNAL*



ANDREW STEWARD

rate e-mail, according to Osterman Research Inc. in Black Diamond, Wash.

And when an e-discovery request lands at your door, you had better be able to show that you can produce documents in a reasonable time frame. Heavy fines and penalties may be levied by the court, which in the case of *Serra Chevrolet v. General Motors* were as high as $50,000 per day for each late response to a discovery request. What's more, companies may have to reach back three to five years for relevant e-mail, because some cases can take years to reach the courts.

Most companies today find themselves in one of two situations, says Alan Armstrong, vice president of business development at Ontario-based Fortiva. "Larger companies are in a constant cycle of litigation and are so busy that they are reactive," he said. "If they could get ahead of the curve, they could save a lot of money, but getting ahead is always a challenge."

Other companies haven't faced any lawsuits since the new FRCP requirements took effect, but they need to weigh the risks and benefits of indexing stored tapes while introducing new e-mail archiving procedures.

In either case, here's how to prepare so you can quickly — and economically — lay your hands on what you need.

CREATE A DATA-RETRIEVAL PLAN

A data-retrieval plan includes an understanding of what data and e-mail the company has and where it is located, as well as a strategy for preserving and identifying that data and being able to collect it when needed. It may also include methods for reviewing and producing documents in-house.

"The more relevant the information that you start with, the more quickly you can find a subset of information," explains Brian Babineau, a senior analyst at Enterprise Strategy Group Inc. in Milford, Mass.

The IT department, business units and corporate counsel all share responsibility for data and e-mail. But corporate counsel is ultimately responsible for managing litigious risk, says Babineau. Counsel should lead planning for data retrieval — a process that includes determining where records are kept and for how long — with input from IT, records managers and business analysts. In a regulated industry, the compliance officer should also be involved in data-retrieval planning.

WEIGH THE RISKS

One of the biggest costs involved in e-discovery during litigation is restoring backup tapes and searching through myriad files to find the few e-mails that support or defend against a legal argument. Not only will tapes need to be searched and restored ($300 to $500 per tape), then indexed and processed ($1,500 to $2,000 per gigabyte), but attorneys must be hired to review those processes and verify the chain of custody (priceless). The process could take weeks or longer.

Legal counsel must balance the cost of resurrecting stored tapes against the potential legal risk.

A company should "look at the applications that generate the most critical business records — financials, executive e-mail or senior-level employee e-mail," Babineau says. Then look at those tapes and where they reside, see how much it would cost to archive them, and balance that cost against the likelihood that you'll face a discovery request, he adds. Companies such as Index Engines Inc. in Holmdel, N.J., specialize in indexing tape without restoring it.

In an industry that's highly regulated, "I would certainly recommend bringing some of that information back to make it more searchable," reducing the chance of exorbitant legal and search fees down the road, he adds.

But less-regulated companies that have large amounts of stored tapes "may want to wait" on indexing, Babineau says. "If you haven't been through a discovery yet . . . I don't think it's necessary to go back and restore all those tapes to an online format" as a preemptive strike, he says. Instead, start archiving e-mail from today forward.

ARCHIVE, DON'T STORE, E-MAIL

Archiving provides a fast, economical way of searching e-mail. By extracting a subset of important e-mail and moving it to a secondary device, organizations can keep more of the right information online for longer periods of time.

"The approach we recommend is to take the burden off of the Exchange [server]," Fortiva's Armstrong says. "Separate the transactional activity of the e-mail system, and take e-mail older than three months out of [the system] and put it into an archive. Then apply retention policies set by the legal team. This is where legal and business has a real discussion. How do we balance asset and liability?"

There are dozens of archiving software systems and appliances available from storage vendors, as well as archiving services from outsourcing providers. Determining the right course depends on the size of the company and IT resources available. Many systems can also archive instant messages, which can also be included in discovery requests.

"All solutions need to be flexible enough to deal with any situation," says Lori Ann Wagner, a partner at Redgrave Daley Ragan & Wagner LLP, a Minneapolis-based law firm specializing in e-discovery and records management. "You can't pull all information out and stick it into a static discovery base and always pull from those."

It's also important to preserve e-mail as metadata or in a format-neutral way, she adds. You never know what type of format the court will ask for. Archived e-mail must be fully auditable to hold up in a legal argument. Archiving software provides audit trails and reporting capabilities to verify the chain of custody and prove that no tampering has occurred.

If a discovery request is submitted for electronically stored information, discovery software, which sits on top of electronic archives, can provide both basic and advanced search and retrieval functions and eliminate duplicate content. While they can greatly reduce the pool of information that attorneys must review, such products are still relatively new.

"I have not personally worked with a company yet, including many in the Fortune 100, that has employed the e-discovery software that comes with the archiving tools to identify and collect evidence," Wagner says. "But they're in the process of looking at those. It's a very hot market."

Most of the processing of evidence — merging e-mail with other company data, assigning a numbering scheme to data and transferring to the required format — should be done by an outside service, Wagner adds.

Purchasing archiving software and storage devices doesn't have to break the budget, especially with cheaper, effective disk-based storage. It can actually be economical, explains David G. Hill, principal at storage management consulting firm Mesabi Group LLC in Westwood, Mass. "If they're boiling [archived data] off of their production database, it makes the production database smaller," he says. "Plus, it's easier to back up and more cost-effective."

WHO SHOULD PAY?

The issue of who pays for data retrieval software, hardware and services remains an arm-wrestling match between the legal and IT departments.

"IT has to put [data retrieval] in its budget for hardware and software and be able to charge it back to the business unit or legal department, depending on the circumstance," Hill says.

"In our opinion, corporate counsel should start investigating budgeting for what we call electronic discovery technology investment," Babineau says. "They're ultimately responsible for managing litigious risk — and part of that is the cost to defend or support an argument. But IT should look at how to run their normal operations more efficiently with electronic discovery in mind."

Budget bickering aside, industry watchers agree that it's better to pay for a data-retention tools upfront than it is to pay later. "You know this is a pending threat," Armstrong says. "Is it the hurricane for which you don't want to have insurance?" ■

Collett *is a* Computerworld *contributing writer. Contact her at stcollett@aol.com.*

The E-discovery Timeline

Horror stories aside, U.S. courts can be reasonable when it comes to the amount of time given to produce e-mail and other electronic documents.

Though the rules provide for 30 days to respond to a request for e-discovery, and a judge might give you 60 to 90 days, "you're almost always in a rolling production – first the stuff that's easy to get at, then more documents as you go along," explains Lori Ann Wagner, a partner at law firm Redgrave Daley Ragan & Wagner.

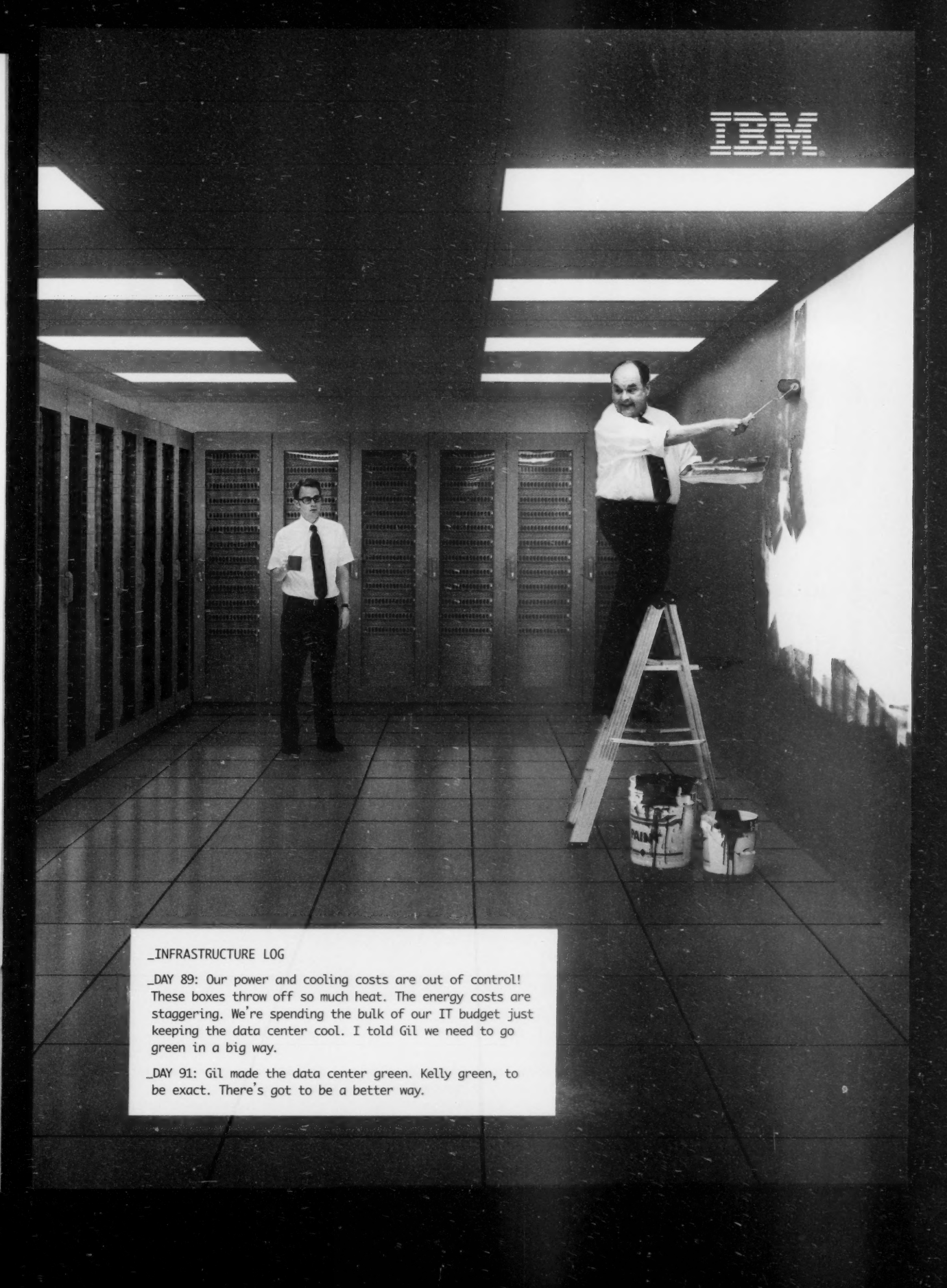
"With the quantities of information that people deal with today," it would be nearly impossible to produce only the relevant e-mail messages in 30 days, says Wagner, noting that some businesses have the equivalent of millions of pages of e-mail. "Discovery will often go on for many months, sometimes years."

So what if you need more time?

The argument that your global company simply has too much data to locate and review can often backfire. "It's a two-edged sword," Wagner says. "A huge company has got a lot of information, but it also has a lot of resources."

But there's wiggle room. If a company can prove its ability and intention to produce e-mail and can explain its infrastructure and the location of employees and data involved, says Wagner, "they might get further by being able to explain to a judge why they need more time."

– STACY COLLETT



_INFRASTRUCTURE LOG

_DAY 89: Our power and cooling costs are out of control! These boxes throw off so much heat. The energy costs are staggering. We're spending the bulk of our IT budget just keeping the data center cool. I told Gil we need to go green in a big way.

_DAY 91: Gil made the data center green. Kelly green, to be exact. There's got to be a better way.

From Backroom to Courtroom

Storage administrators gain status as they team up to meet the new rules of e-discovery.

By Thomas Hoffman

ANDREW STEWARD

IN THE NINE MONTHS since Ed Rolison became a storage analyst at a leading global bank in England, he hasn't exactly become the most recognizable person in the office. Rolison, a contractor from IT services provider Getronics NV, rarely talks with colleagues about support of the firm's SAN environment.

"It's still mostly a background role," he says.

But all that could change as the bank installs new EMC Centera storage systems and an enterprise vault in order to make it easier for up to 40,000 employees to access e-mail and other records from its archiving systems for legal purposes.

As access to archived records is simplified for bank employees over the next few months, Rolison will likely have a more discernible role in the organization — even if he doesn't suddenly become the big man on campus. "More and more people are realizing the importance of managing, moving and maintaining multiple terabytes of data," he says.

Rolison doesn't expect to achieve

Continued on page 38

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Continued from page 36
celebrity status, but his situation is representative of how storage administrators are beginning to gain stature in their organizations. That's because storage professionals are increasingly being called upon to work more closely with corporate legal departments. They're also assisting with electronic discovery efforts to help satisfy regulatory requirements for determining where information resides within a business and how it's being managed.

For storage professionals who have this type of expertise, the boom in e-discovery work "is creating new roles and opportunities," says Frank Wu, managing director at Protiviti Inc., a consultancy in Menlo Park, Calif.

Many storage administrators at publicly held U.S. companies already have to deal with obligations imposed by the Sarbanes-Oxley Act, since they often support corporate officers who are held accountable for the security and access rights to financial data. More recently, storage professionals have become more involved in dealing with stiffer e-discovery rules. The upshot is that some corporate legal departments have already begun working more closely with storage administrators to determine where critical information may reside and how to access it.

As a result, "storage administrators are rising up the stack in a lot of companies," says Andy Cohen, associate general counsel at EMC Corp. in Hopkinton, Mass.

THE STAKES GET HIGHER

But this emergence from near anonymity "is a double-edged sword" for some storage professionals, notes Richard Scannell, senior vice president of sales and marketing at GlassHouse Technologies Inc., an IT infrastructure consultancy in Framingham, Mass. Scannell, who earlier in his career oversaw a 160-person IT unit at Motorola Inc., says the increased visibility for storage administrators also means added pressure.

"One guy was telling me that he's one mistake away from losing his job," says Scannell. "Amateur hour [for e-discovery] is over."

The e-discovery surge is also leading more storage professionals to seek training to familiarize themselves with new regulatory requirements and to further themselves professionally.

"We've seen a tidal wave of activity in this space," says Cohen, who is also vice president of compliance solutions at EMC. For instance, the vendor runs a workshop that brings together IT, legal and compliance professionals to instruct them about various facets of e-discovery requirements.

"We're seeing tons of activity where IT [workers] want to understand what the process is and a forum to let legal [professionals] know what their challenges are," Cohen adds.

The e-discovery boom has created an intersection between corporate IT, legal and compliance departments, say observers. The overlap between these groups is creating additional job opportunities for storage experts.

"We're seeing certain instances where legal departments are looking for IT professionals to work in those departments and help them get their arms around electronically stored information," says Protiviti's Wu.

In other cases, storage professionals with e-discovery skills are being recruited by corporate IT departments, he says. In both cases, recruiting is strong at companies in highly litigious or heavily regulated markets, such as the utilities, pharmaceutical and financial services industries, says Wu.

RECRUITERS TAKE NOTE

Laura Maslowski has had limited experience with e-discovery as a systems administrator at USIS Commercial Services, a provider of employee drug- and background-screening services in Tulsa, Okla. Nevertheless, her experience with Network Appliance Inc. products has generated a few recruiting calls from a headhunter in Arkansas over the past several months. A 17-year IT veteran, Maslowski hasn't seen giant leaps in salary over the past few years, but she says that "depends on who writes the [annual performance] review." Maslowski says she would like to earn a storage certification to see what opportunities could open up.

Rolison, who has taken 10 EMC courses over the past year, says he has recently received "quite a lot" of offers from recruiters looking for SAN experts to work for London financial services firms. But the high cost of city living has kept him in Coventry, 120 miles northwest. "The theory," says Rolison, "is that if you can work [in IT] for a high-end bank for a few years, you're well set for the rest of your career." ■

One More Task

Storage administrators come in all sizes. In some organizations, they have dedicated positions. In others, storage responsibilities are tacked onto the roles of Unix or data center administrators.

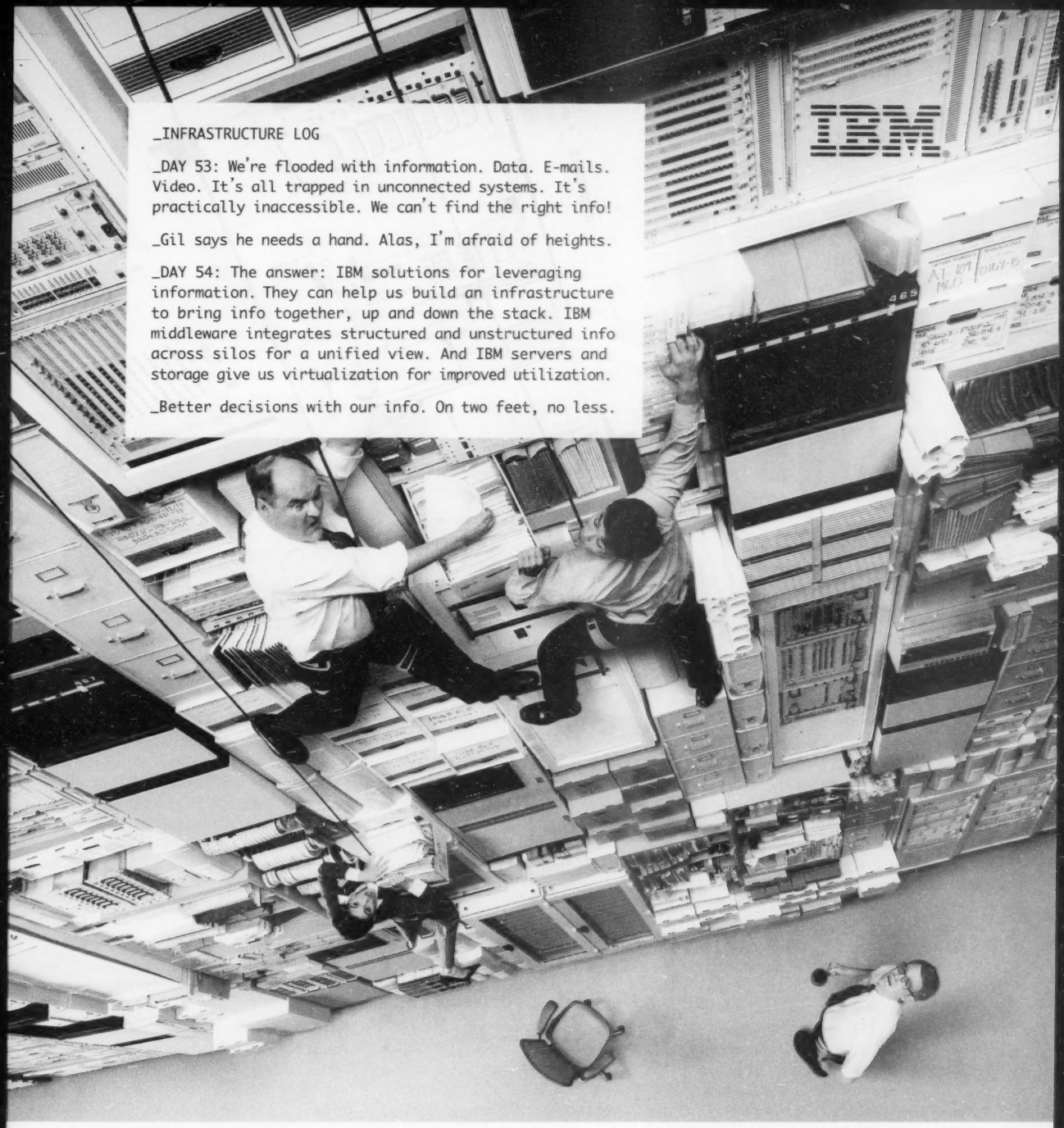
For Todd Thomas, it's just one more thing that he has to do as CIO at Austin Radiological Association PA (ARA). The organization, which provides MRIs, mammography and other imaging services to hospitals and physician groups in central Texas, has more than 100 terabytes of managed storage split between its NAS, SAN and image archives.

Although medical images represent 90% of what ARA stores and are handled by its data center manager/storage administrator, Thomas has overseen the retention of documents, contracts and other business data since February. He took over those responsibilities after the changes introduced to the Federal Rules on Civil Procedure, which require companies involved in civil litigation to be able to produce electronic records within 30 days of a court case being filed.

Thomas accepted the role to ease the burden on his data center manager. Still, he is looking to simplify the responsibilities. Thomas recently began looking for a third-party vendor that can replicate ARA's e-mails off-site. That would mean one less thing for his organization to do.

"It hasn't been fun work," says Thomas, who oversees an IT staff of 33 people. "When I look at the amount of data the business generates versus the amount stored for medical reasons, [the business data is] a small subset of [the total]. Since it's such a small percentage of what we manage, I would prefer to outsource that."

– THOMAS HOFFMAN



_INFRASTRUCTURE LOG

_DAY 53: We're flooded with information. Data. E-mails. Video. It's all trapped in unconnected systems. It's practically inaccessible. We can't find the right info!

_Gil says he needs a hand. Alas, I'm afraid of heights.

_DAY 54: The answer: IBM solutions for leveraging information. They can help us build an infrastructure to bring info together, up and down the stack. IBM middleware integrates structured and unstructured info across silos for a unified view. And IBM servers and storage give us virtualization for improved utilization.

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How the Rules Have Changed

The high cost of retrieving data is no longer an excuse in a civil procedure. Here are the other changes you need to know about. **By Mary Brandel**

IF YOU'RE an IT professional who's also interested in legal affairs, there has never been a better time to blend the two worlds. With the amendments in December 2006 to the Federal Rules of Civil Procedure (FRCP), IT has become inextricable from the discovery process of corporate litigation.

"IT has to be a part of most of these matters because, regardless of whether it's sexual harassment or slip-and-fall, it all involves some level of electronic information," says Brian Babineau, an analyst at Enterprise Strategy Group Inc.

In fact, in an ESG survey in August, 44% of 568 IT and records management professionals polled said they had a dedicated or specialized IT staff to help with the discovery of electronically stored information (ESI), whereas only 4% said they had specialized e-discovery attorneys. "IT has to dedicate people to the lawyers," Babineau says.

And while the FRCP changes were intended to make e-discovery easier and cheaper to do, they were based on the presumption that IT organizations were managing things better than they actually were, says Jim Minihan, president of IMerge Consulting in Orlean, Va. "So now IT has to do all this stuff they never thought of before, including records management and closer supervision of data systems and how things are being stored in 100% of the cases," he says. "Before, they'd worry about it when they were sued, but because there's now a defined process, the penalty of not following procedure can become horrific."

We've compiled an FAQ to help you understand the changes to the FRCP.

WHY SHOULD THE FRCP CONCERN ME AS AN IT PROFESSIONAL?

The FRCP directives govern federal civil lawsuits. Before Dec. 1, 2006, the rules didn't formally address ESI or companies' responsibilities for preserving and producing this data. But now, "the rules say, once and for all, that electronically stored information is now discoverable, just like paper documents," says John Thomure, an attorney at Michael Best & Friedrich LLP in Milwaukee.

The intent is to provide clearer standards to help resolve or reduce disputes over data preservation, according to Robert Sikellis, associate general counsel at Vance International Inc., a Centreville, Va.-based consulting firm that offers digital investigation and litigation-support services.

What this means for IT, Sikellis says, is increased pressure to proactively manage data in order to avoid sanctions or unfavorable rulings that would result from failing to produce ESI that's relevant to a case. "Legal and IT professionals need to come together to understand the new rules and their impact on IT planning and management," he says.

Continued on page 42

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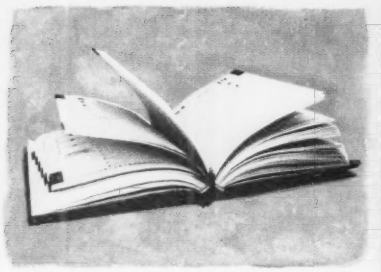

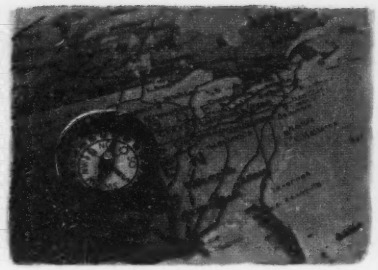

Continued from page 40

WHICH RULES DO I NEED TO BE AWARE OF?

ESG's Babineau summarizes the relevant rules this way:

Rule 26: There are three important parts to this rule. First, as soon as a claim is filed, the parties must meet and discuss, among other things, any issues relating to disclosure or discovery of ESI. Second, the parties must identify — without awaiting a discovery request — all ESI they may use to support their claims or defenses, both by category and location. And third, parties are not required to search or produce data from sources that aren't reasonably accessible. Typical examples are magnetic backup tapes used for disaster recovery and older data stored on obsolete and unused media.

Rule 34: As part of the pretrial discovery process, ESI must be produced in a form in which it's ordinarily maintained or in a reasonably usable form.

Rule 37: Routine, good-faith business operations may provide protection from sanctions for destruction of ESI.

SO, HOW DOES THIS CHANGE THINGS FOR IT?

IT professionals will now have to be involved any time their companies enter litigation. And, because of the changes to Rule 26, IT needs to do a lot of advance preparation.

"Essentially, an attorney has to understand what information exists, what category it falls into, where it's stored and how much it would cost to produce as evidence," Babineau says. And because most general counsels and IT professionals don't have a complete understanding of what ESI the company has and how accessible it is, IT must create a detailed road map.

WHAT DOES THIS ROAD MAP NEED TO INCLUDE?

Sikellis says such a road map should detail where all ESI is stored. This includes deleted data, data in systems that are no longer used, and data in remote or third-party locations. Data sources should include all media and formats, such as backup media, portable media, audio recordings, images, other data compilations, and remote or third-party locations.

You also need an idea of how quickly various forms of ESI can be processed and reviewed, prior to production. "You want to go into the scheduling conference with full awareness of your timetables," Thomure says.

CAN I JUST WAIT UNTIL LITIGATION HAPPENS TO WORRY ABOUT THIS?

It's tempting to wait, but it's better to be prepared. Minihan says, "There are some lawyers who would say, 'I can't tell you how to have a foolproof organization that would work properly under the e-discovery rules, so don't do anything, and we'll just deal with it when we have to.' " But while it's easy to get overwhelmed by the cost and operational changes involved in preparing for e-discovery, it's crucial to not get caught flat-footed, Thomure warns. "If you haven't thought of preserving ESI before the Rule 26 discovery conference, you may be in trouble," he says. "Discovery moves quickly, so you must plan for handling ESI early."

Babineau says it would be better to document three years' worth of e-mail archives than let the opposing party go on a fishing expedition. "They may find out you have Years 4 and 5 on tape that you didn't know about," he says. "That raises the question, 'What else do you have back there?' "

WHAT ARE THE TYPICAL TYPES OF DATA REQUESTED?

It's advisable to identify, categorize and create a map of where and how you store all documents and information, including general correspondence, corporate records, contracts, pension documents, safety and environmental records, financial statements, tax records and more.

However, the two most-requested types of data are e-mail and business records that are stored in databases, according to Milford, Mass.-based ESG's survey. Business records include invoices, customer records and financial statements.

The type of data you're likely to be asked to produce will vary according to industry, Babineau says. At biotech companies, drug-trial documents would be likely targets; at real estate firms, building code permits might be at the top of the list; and at entertainment companies, copyright and content ownership documents could be in demand.

"Once you understand your biggest area of risk, you can start to prioritize where you spend your time on these new rules," Babineau says.

HOW FAR BACK MIGHT I BE ASKED TO RETRIEVE DATA? AND HOW LONG WILL I HAVE TO COMPLETE THE REQUEST?

In ESG's survey, 48% of the respondents said the average age of the information they had to produce in a discovery situation was 36 months or older.

"By the time you get through hearings, pretrial conferences and arguments back and forth, it might take two or three years to just get going on a case," Babineau says. "Companies need to figure out a way to cost-effectively keep and find this information."

ILLUSTRATIONS BY ANDY STEWARD

WHAT DOES 'NOT REASONABLY ACCESSIBLE' MEAN IN RULE 26?

There's nothing exact about it. Before the trial, companies are required to identify "unreasonable" sources of ESI, based on the cost or labor required to access it, but the judge makes the final decision. That's why, Thomure says, companies need to detail the time, effort and cost of searching for, retrieving and producing documents, as well as the likelihood of finding relevant information in that ESI source. If you cite undue cost, Sikellis says, you must be able to quantify the actual cost required to preserve, collect, restore and access the ESI. You should also prepare someone to make this argument in court, since not all IT professionals know how to testify, Sikellis says.

Even if the judge rules in your favor, the court could still require the discovery if the requesting party shows "good cause," Thomure says. The opposing party might also agree to shoulder the cost.

WHAT DOES RULE 34 MEAN?

Parties must specify the form in which they intend to deliver ESI, and this form must be one in which it's ordinarily maintained or one that's reasonably usable, Thomure says. You can't, for instance, deliver a static form of a file purged of metadata, he says.

This might become an issue if you encrypt your databases or if you have a system that stores images separately from the metadata associated with them, Minihan points out. "You not only have to turn over the data in its pure form; you have to turn over the catalog that points to it or the tools to open and unencrypt it," he says.

WELL, AT LEAST I'VE GOT A 'SAFE HARBOR' IN RULE 37, RIGHT?

Yes, but don't bank on it, observers warn. Under the rule, you are protected from being punished for deleted data if the data was destroyed as a result of good-faith business procedures. However, that means you need to have solid retention policies in place, and you need to be able to prove that the entire organization adheres to those policies consistently, Minihan says. "All the judge has to do is find that while the retention policy for this series of information was complied with over here, with this other series, you didn't comply," he says. "If you didn't consistently apply the policy, the safe harbor is gone."

SO WHAT I DON'T SAVE WON'T HURT ME?

Not really. Once a litigation threat is known or a lawsuit filed, companies must preserve all documents that might be relevant to the case, including anything normally scheduled to be destroyed under the retention policy, Thomure says. That means that IT has to help identify people possessing potentially discoverable data and identify all forms of backup storage potentially containing relevant evidence, he says. Backup storage tapes should be excluded from routine recycling.

And remember, not saving something is different from deleting it, Minihan says. Many companies think data is overwritten just because their retention schedule says it can be deleted after 90 days, but in fact, it could be in a queue somewhere waiting to be deleted. That means it's still discoverable, he says.

This type of scenario will affect the e-mail and storage management policies that IT has in place, Minihan says. For instance, it's typical to move data further from online usage the older it gets. But some companies might want to stage older data upfront to ensure it gets deleted. This is particularly true for e-mail, Babineau says. "Right now, organizations think it's gone, but it's on a backup disk," he says. ■

Brandel *is a* Computerworld *contributing writer. Contact her at marybrandel@verizon.net.*

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The Big Backup Squeeze

A survey says backup duties are a time sink, yet fast access to stored data is crucial. Is disk-to-disk the answer? **By Lucas Mearian**

FED UP with slow tape backup systems and under pressure by regulators and auditors to keep data online and readily available, large and midsize businesses are making disk-to-disk backup technology a top priority in their data centers this year.

More than 75% of 150 large companies surveyed by TheInfoPro Inc., a New York-based independent research firm, said disk-to-disk backup technology is being used in their data centers, compared with 67% that were implementing it a year ago.

Still, in this latest survey, conducted in May, only about one-third of the respondents said they use virtual tape libraries, a form of disk-to-disk backup that uses disk arrays to mimic tape for server backup jobs.

FILE IT RIGHT

One in four IT managers surveyed said they believe poor archiving practices are a key reason for unchecked data growth. The average company has 250TB of active storage space dedicated to archive-related content. Moreover, the survey found that archive capacity among companies is expected to grow by 52% by year's end.

Sean O'Mahoney is manager of client/server computing at Norton Healthcare Inc., the largest health care system in Kentucky, with more than 2,000 physicians. He rolled out three disk-to-disk backup systems over the past year to help the Louisville-based organization deal with a 50% year-over-year archival data growth rate that pushed the backup window to 20 hours per day.

Since connecting its Picture Archiving and Communications System to an EMC Clariion Disk Library 710 array and Clariion Disk Library 4100 array, Norton has cut its backup window by more than half — to eight hours per day. O'Mahoney says he also plugged the company's financial systems into an EMC Centera disk array, which is a WORM permanent archive system.

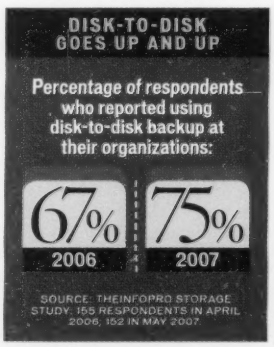
In all, Norton Healthcare has 200TB of capacity dedicated to disk-to-disk backup, the vast majority of which is used for storing radiological images such as X-rays, which do not lend themselves easily to compression.

Besides shrinking its backup window with disk-to-disk technology, the organization also improved data restore times by as much as 75%. It used to take four days to retrieve data from tape because Norton's AIT-2 tape drives have a maximum throughput of 6MB/sec., compared with the Clariion disk array's 60MB/sec. rate. "The speed of the media is vital," O'Mahoney says.

SQUEEZED BY TIME AND BUDGETS

TheInfoPro's latest survey revealed that IT managers consider backup activities among the most time-consuming. It also found that staffing remains flat and budgetary pressure to cut costs is at an all-time high.

A study by Gartner Inc. earlier this year predicted that by 2010, disk — not tape — will be the primary medium for data recovery. It also predicted that by 2011, the ability to take continuous snapshots of data will be an embedded function in backup and data replication software and will no longer be a separate feature. Currently, only 17% of companies have deployed continuous data protection, according to TheInfoPro's survey.


DISK-TO-DISK GOES UP AND UP
Percentage of respondents who reported using disk-to-disk backup at their organizations:
67%
2006
75%
2007
SOURCE: THEINFOPRO STORAGE STUDY; 155 RESPONDENTS IN APRIL 2006, 152 IN MAY 2007

"The need for high-performance online recovery of data, combined with the availability of low-cost disk arrays, has influenced enterprises and small and midsize businesses to adopt a disk-based approach for backup and recovery," wrote Dave Russell, author of Gartner's disk-based storage report.

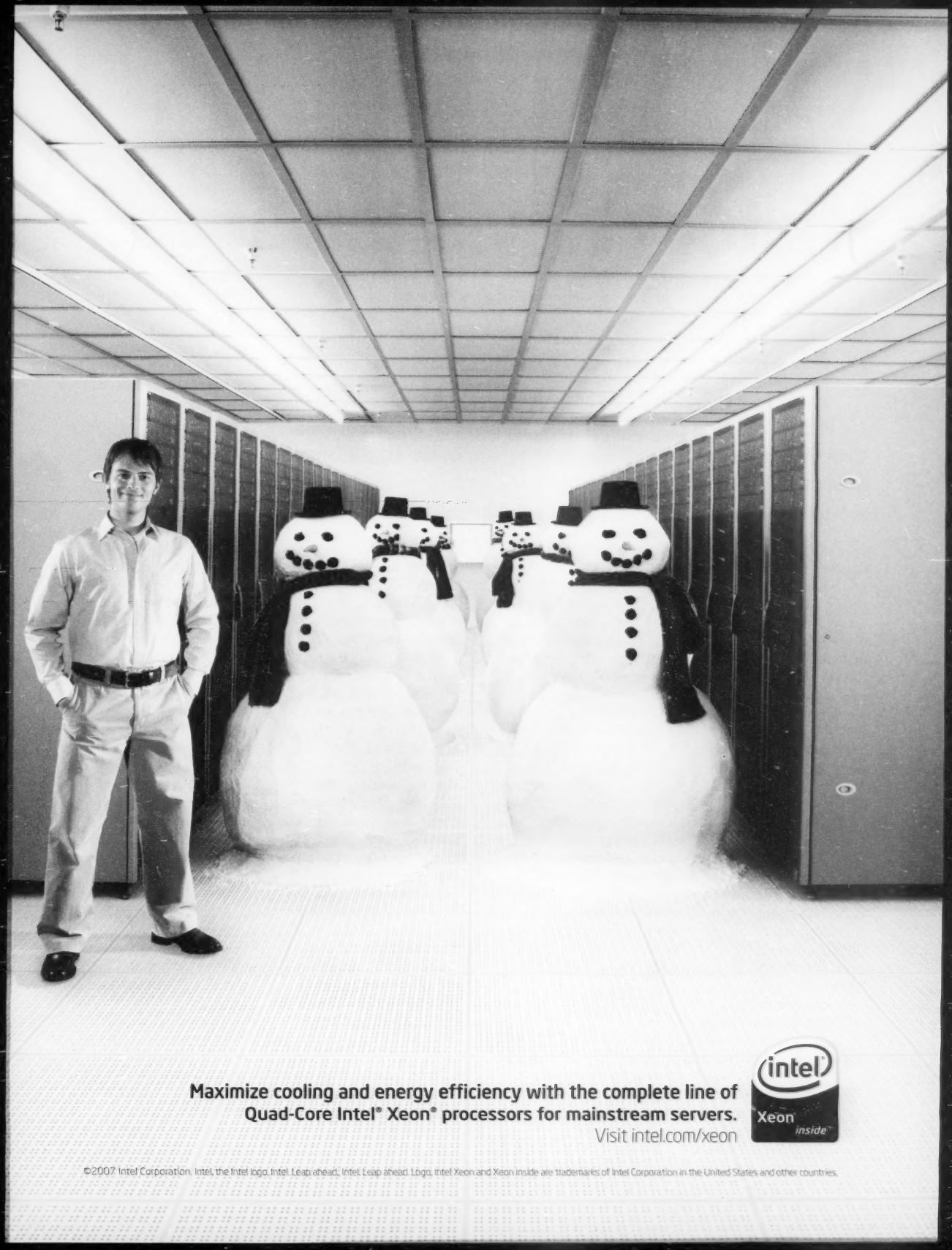
Tony Asaro, an analyst at Enterprise Strategy Group Inc. in Milford, Mass., says the driving force behind the disk-to-disk backup boom is a combination of massive data growth, which is expanding backup windows, and legal and auditing requirements that force firms to keep records online and accessible for longer periods.

"Everyone we know is doing some sort of disk-to-disk backup," Asaro says.

Most companies, however, are still relying heavily on tape backup for archive, keeping data on disk for 120 days or less, Asaro says.

O'Mahoney says he typically keeps data on his disk-to-disk backup systems for about three weeks. His company's auditors, however, recommend that he keep that data on disk for at least five weeks, something O'Mahoney is now planning to do.

Also, after seeing some proofs of concept that apply to his company's infrastructure, O'Mahoney says his disk-to-disk systems will benefit somewhat from emerging de-duplication technology, which he hopes to roll out over the next year. De-duplication ensures that only a single instance of structured or unstructured data is copied during backup. In many cases, the vendors claim, de-duplication can reduce capacity needs by as much as 80% on more costly disk-based subsystems. ■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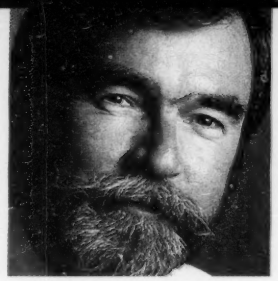
Mark Hall

History Revisited



THOSE OF a certain age will remember when John Poindexter and Ollie North thought they were being extremely clever by electronically shredding nearly 6,000 e-mail messages in November of 1986. They had hoped to mask their involvement in the Iran-Contra scandal, which had just hit the news. According to the National Security Archive in Washington, it took them three days to delete those files. I bet they felt pretty smug and safe when they completed their coverup.

Pity for them that they overlooked the daily backup tapes the White House Communications Agency made of IBM's Professional Office System, or PROFS, files. With those PROFS messages in hand, Congress and the courts were able to unearth the truth about Iran-Contra, a sordid tale of negotiating with terrorists and illegally funding unsavory Nicaraguan rebels. Both Poindexter and North were convicted in court on multiple counts, including destruction of documents. (The next year, Poindexter's conviction was overturned on a legal technicality.) All these misdeeds were brought to light because of the centralized backup and archiving tools in PROFS.

Poindexter and North became the poster boys ("Wanted" posters, in this case) for why companies needed centralized systems to manage e-mail. If they had been using PCs or Unix workstations with distributed messaging applications and no central backup and archive software, their illegal actions would have gone undetected, mainframe and minicomputer vendors argued at the time.

Today, similar arguments are being dusted off to defend on-premises software, such as an IBM Domino server with a Lotus Notes client or Microsoft Exchange paired with Outlook. This time, the argument goes, you need the big, expensive-to-maintain software to handle messaging data for discovery and compliance purposes. And this time, instead of PCs, you need to beware of messaging services, such as Google's Gmail or Zimbra's Collaboration Suite. These services use a browser as the client, and the server component is somewhere in the scary Internet cloud.

■ This time, instead of PCs and distributed systems upending mainframes and minis, Internet services will push aside on-premises messaging software.

My guess is that the story will end the same way. Instead of PCs and distributed systems upending mainframes and minis, Internet services will push aside on-premises messaging software.

Within five or six years, you'll discover that e-mail, mission-critical as it has become, is better suited to be managed by an off-premises service. Those services will offer complete backup and archiving tools that are managed by policies you set from your browser. You'll be able to back up and archive the messaging data, which will be fully indexed for discovery and auditing purposes, on your local data stores, at your messaging service provider, or trucked off to Iron Mountain or wherever you send aging data. You'll be able to determine who accesses which files and decide when to delete files based on company and legal requirements. The services will provide a complete audit trail that will stand up in a court of law.

Your end users can have plug-ins to their browsers that will give them the look and feel of a Notes or Outlook client. Zimbra already has a very slick plug-in for Outlook that is virtually indistinguishable from the real thing. So, you're not going to get any complaints from your users or your bosses. They probably won't even know the difference when you switch everyone over.

Because of browser plug-in technology, users will be able to take their laptops on planes, read and write e-mails, and use synchronization software that's similar to what they use now with Domino and Exchange. Only this time, it will be updating messaging systems with your service provider and not servers in your data center.

History will repeat itself, and Domino and Exchange servers will end up in the same place as PROFS — which is to say, technology's dustbin. ■

Mark Hall *is a* Computerworld *editor at large. Contact him at mark_hall@computerworld.com.*

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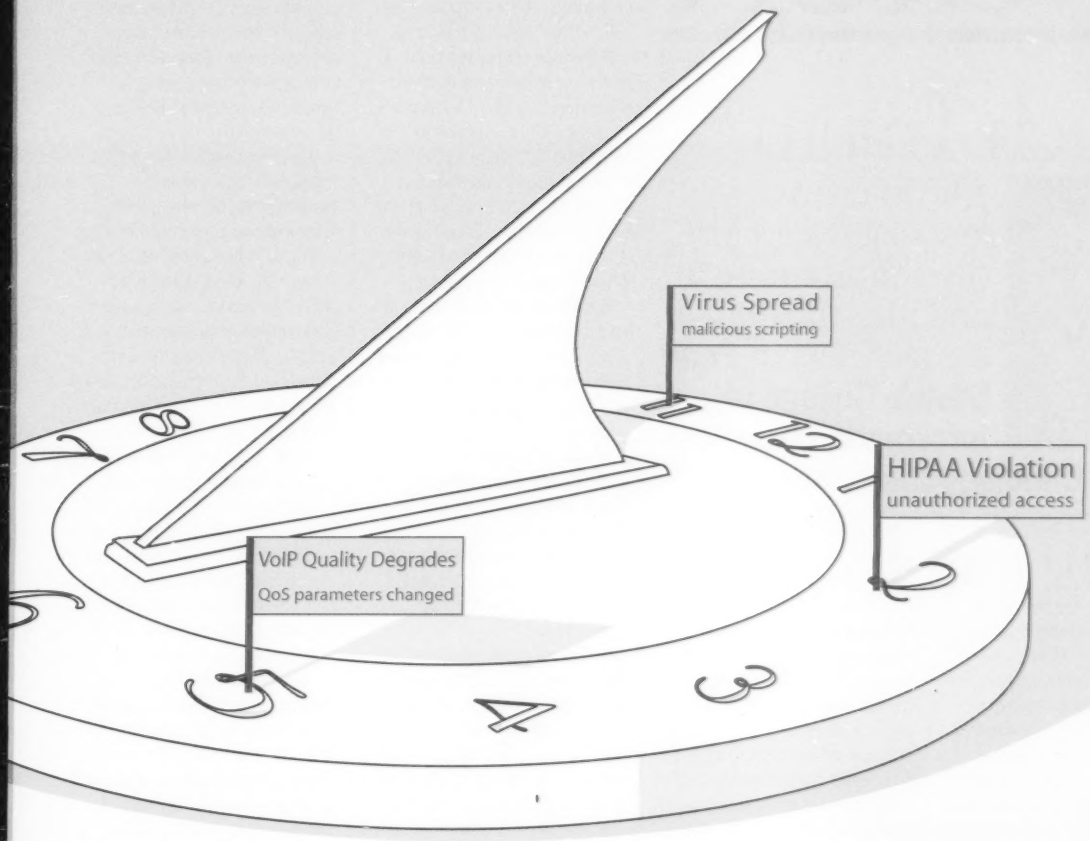

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Career Watch

■ **Q&A**

Eileen Trauth

The interim associate dean for diversity, outreach and international engagement at **Penn State's College of Information Sciences and Technology** discusses women's under-representation in the IT workforce.

Why is it important to pull women into the IT workforce? There are two reasons. One is social inclusion. The societal barriers that women experience should be addressed for the same reason that we address barriers to race or disability. The second reason is pure economics. Women represent half of the population of the American workforce, and any society that disenfranchises half of its working population puts itself at a distinct disadvantage in the competition for brain power in a knowledge society.

Why are women so under-represented? There is no simple answer. The National Science Foundation and similar agencies in other countries have funded a considerable amount of research to try to understand this. I have received an NSF grant to interview women IT professionals about the issues they have encountered in their careers, and some of the factors that I have explored are:

■ **Cultural definitions of femininity that place IT outside the boundary of "feminine."** As girls who are influenced by these cultural norms begin to develop their gender identities in the tween and early teen years, they also begin to view a technological profession as nonfeminine.

■ **Historical associations of technology with power and men with power.** This exerts pressure to keep control of technology in the hands of men. Those who have written about gender and technology have made this argument.

■ **Gender stereotypes.** IT professionals portrayed in the media are typically men. This reinforces the assumption that IT is for men only. In the 200-plus interviews that I have conducted with women in IT in several countries, one theme that appears over and over again is that women have to prove themselves to a much larger extent than men.

■ **Expectations.** Some people take the low number of women in IT to mean that women do not want to be in this field or are not able to work in it. People who hold that view might communicate it to their children, students or employees.

■ **Women have more options these days.** Hence, they don't need to put up with hostile workplaces, unequal pay, harassment – all of the kinds of things women in my interviews have related to me.

■ **The critical mass conundrum.** This is a "chicken and egg" explanation. The fewer women in IT, the more it is a men-only club. And the more it is a male club, the more women might feel uncomfortable in it. It is generally thought that a critical mass would exist when there are 25% to 30% women.

How can IT attract women? We aren't being nearly as effective as we need to be. We have to work very hard to increase the number to critical mass. Once that occurs, then the sheer number of women will go a long way toward addressing the issues I have raised above. But there are some barriers that need to be overcome in order to achieve this critical mass.

First, something that troubles me very much is the hostility that I have experienced because I am engaged in this research. For example, my graduate student and I have been subjected to some pretty hostile comments from people who appear to be opposed to any scholarly attempt to understand and address the gender imbalance.

Second, addressing the gender imbalance is not a "woman's problem"; it is a societal problem. In the same way that the American civil rights movement of the 1960s engaged people of all races, this problem needs to engage people of all genders. This also means that assuring gender equity in the workplace is not the problem of the lone woman who might be experiencing inequality. It is the responsibility of every person in the institution to ensure that inequality is eliminated.

Third, we need both strategy and accountability. On numerous occasions, I would interview a manager at a company who would tell me about the great gender/equality/diversity programs in place. Then I would interview an entry-level woman who would tell me about harassment and exclusion. Quite often, these women had no realistic vehicle for raising the issues. Fourth, people should be educated – both men and women – about gender issues. Some people still don't believe there is anything wrong with our current situation. There are also cultural differences related to gender, and this is especially challenging when it comes to cross-cultural work teams. ■

IT: A Man's World

Gender of Bachelor's and Master's Degree Recipients

	Bachelor's						Master's					
	CS		CE		CS&E		CS		CE		CS&E	
Male	10,429	85.8%	1,824	85.8%	12,253	85.8%	5,353	77.1%	696	78.4%	6,049	77.3%
Female	1,725	14.2%	302	14.2%	2,027	14.2%	1,587	22.9%	192	21.6%	1,779	22.7%

SOURCE: 2005-06 COMPUTING RESEARCH ASSOCIATION TAULBEE SURVEY OF 235 PH.D.-GRANTING DEPARTMENTS OF COMPUTER SCIENCE AND COMPUTER ENGINEERING IN THE U.S. AND CANADA, MAY 2007

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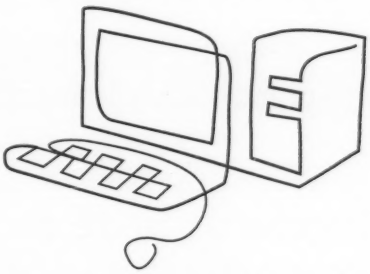

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Shark Tank

TRUE TALES OF IT LIFE AS TOLD TO SHARKY

There's Always A Reason

The batteries die in this pilot fish's cordless keyboard, so he orders a new set, installs them and gets back to work. A month later, the batteries die in his cordless mouse, so he repeats the process – and this time, the new batteries spark a reaction. "Evidently, I wrote down 'mouse' when I got the batteries for my keyboard," says fish. "I got an e-mail from our accounting guy that said, 'Are you eating batteries? I have worked here for over six years and have never replaced batteries in my mouse.' " Fish strolls down to the accounting guy's office, verifies that the accounting guy has a corded mouse, and grumbles, "I really need to find some of those six-year mouse batteries."

So Long

Over the course of a big project, this company has seen a whole string of consultants come and go. "One consultant that had been with us for a number of years sent an e-mail to the entire company on his last day," says a pilot fish in the loop. "My favorite part of the message was the following: 'Over the past three years, you have taught me more than I could ever ask for and, in most cases, ever did ask for. I have been fortunate enough to work with some absolutely interchangeable supervisors on a wide variety of seemingly identical projects – an invaluable lesson in overcoming daily tedium.' Something tells me he was not very sad about leaving."

Losing and Damaging IT the Navy Way

Milspec pilot fish reports that the mandatory Web browser home page for the managed computers at his site carries this notice: "Did you know: If you lose or damage NMCI equipment, there are established policies and procedures you must follow." Grumbles fish, "I've submitted a feedback form that asks the contractor to reword this to: 'To report lost or damaged NMCI equipment, you must follow these established policies and procedures.' "

That's Probably Best

Pilot fish is in the repair room, working on a computer, when the boss sticks his head in the door. "He asked what I was doing, and I told him that the network card was bad and I was replacing it," says fish. "He started to rant and rave, going on and on about how everyone blames everything on the network. I finally managed to get a word in and explain that the problem was in the card and not the network. At that point, he stopped and thought and then told me, 'So why are you wasting your time? You just need to format the card.' I couldn't think of anything to say."

■ *Don't say anything — just write down your true tale of IT life and send it to me at sharky@computerworld.com. You'll score a snazzy Shark shirt if I use it.*

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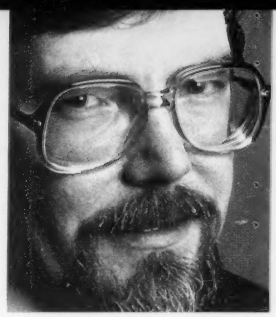
■ FRANKLY SPEAKING

Frank Hayes

Disposable PCs



I GIVE UP. You should too. It's time to stop trying to secure users' Web browsers, and instead just throw them away. We can't stop users from clicking on the wrong links or going to compromised Web sites. We can't eliminate drive-by worm infections or block zero-day rootkits. But thanks to virtualization, we can flush them all away.

Look, right now a user's Web browser is a threat magnet. To display fancy Web sites, the browser can't just render HTML; it also has to run code, which may be designed to do nasty things to the PC underneath the browser. The browser also automatically downloads a wide variety of files, some of which can contain more malware. And as users spend even more time surfing Web 2.0, there will be even more chances to collect trouble.

Firewalls and antivirus software can block or kill some of it. But the bad guys keep getting more clever and more subtle. And more prolific — for example, antivirus vendor Symantec says it now identifies new malware variations at the rate of nearly 1,200 *per day*.

Worse still, all that junk can hang around in the browser or PC until it's forcibly removed. That's if it *can* be removed.

There's one sure way to get rid of it: Throw away the PC. That's expensive — at least, if you're actually throwing away the hardware. Or you can throw away just the software by reimaging the hard drive; no hardware cost there, but it still chews up time and manpower.

But what if users are working on a virtualized PC, or at least a virtualized Web browser? Then throwing it out is trivial. So is replacing it with a fresh, uncluttered, uninfected version. Virtual IT is built to be disposable.

OK, you've heard about this virtualization magic before. But it seems too good to be true, it sounds complicated and expensive, and users will scream bloody murder if you take away their real PCs and Web browsers.

■ We know users won't follow our security rules about where to go and what to do, but they'll happily buy into disposable IT.

There's a good reason to take a close look at it now, though.

Last month at the DemoFall conference in San Diego, I saw two companies trotting out virtualization products. One, Qumranet, was showing a system that lets users do self-provisioning of virtual PCs. The other, Check Point Software, had consumer software for virtualizing Web browsers. Products from other vendors can't be far behind.

Qumranet's Solid ICE is corporate software that should be out by the end of the year, and they won't talk about pricing yet. But Check Point's ZoneAlarm ForceField will retail for $29.95 early next year for home users.

That's not complicated and expensive. It's cheap, and as a consumer product, it's got to be easy.

Better still, it's something users will accept. We know many of them won't follow our security rules about where to go and what to do, and they can't manage to keep their PCs and browsers clean of malware.

But they'll happily buy into disposable IT. They live in a throwaway culture: Use it once and then toss it out. As long as it's just like the real thing, virtualization is a natural fit for them.

And for IT, virtualization changes the security game. A virtual PC or browser can be defined and sandboxed. Then, no matter what users do with it, no matter how badly damaged it becomes or what junkware it collects, it can easily be dumped and replaced.

In fact, it should routinely be dumped — along with all the worms, viruses, spyware, keyloggers, rootkits and everything else it has collected.

Instead of spending endless, fruitless time trying to block or catch these browser-borne security threats, we can just throw them away and concentrate on all the other security problems we should be dealing with.

So give up. Usable virtualization is finally arriving. Real PCs and Web browsers will never be safe in the hands of real users. And the sooner we go virtual and start throwing them away, the better off we'll be. ■

Frank Hayes *is* Computerworld's *senior news columnist. Contact him at frank_hayes@computerworld.com.*

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